Universities Quarterly

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Too Few Academic Eggs
B. V. BOWDEN

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MILDRED COLLINS

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Sesquicentennial Letter from Oxford, Ohio
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VOLUME 14 NO. 1 NOV. 1959/JAN. 1960

CONTENTS

Too Few Academic Eggs.....*B. V. Bowden* 7

Letter from Oxford, Ohio.....*Leo Silberman* 24

The African Student and Campus Fraternities
A. H. M. Kirk-Greene 27

What Is Mathematics?.....*Herbert D. Deas* 35

University Student, 1953. II. Schooling.....*Nicolas Malleson* 42

Health, Family and Teaching.....*Mildred Collins* 57

Sorting Students Mechanically?.....*E. B. Butler* 67

Clearing House or Interview?.....*H. Wright Baker* 77

The General Knowledge of Students.....*H. Maddox* 81

Correspondence:
University Standards.....*R. R. Dale* 84

BOOK REVIEWS

The Use of Imagination.....*G. H. Bantock* 87

School and Community in the Tropics.....*Lionel Elvin* 90

The Sociological Imagination.....*Peter Willmott* 92

The Emergence of German as a Literary Language
H. S. Reiss 95

Sir Gawain and the Green Knight.....*Francis Berry* 98

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TOO FEW ACADEMIC EGGS

B. V. BOWDEN

Principal, the Manchester College of Science and Technology

> It is desirable that a little external pressure should be brought to bear upon the universities. It would not do to trust either the universities or the colleges with the entire management of the reforms, for I believe that they are not the exception to the rule, which has been found to exist elsewhere, that hardly any Corporation is capable of entirely reforming itself without external pressure.
>
> (Archbishop Tait)

> Efficiency is a ruthless word, and it may seem to be cruel to do away with a very picturesque if out-of-date system; but if the interests of national education demand it, it will have to be done.
>
> (A. I. Tilliard)

IT is very clear from the reactions to Lord Simon's proposal for a Royal Commission on Universities* that members of university staffs, or at least those who feel inclined to write for *Universities Quarterly*, are fairly well content with things as they are, and would regard the investigations of a Royal Commission into any of the affairs with which they are concerned with very great disfavour. I do not believe, however, that their antagonism to an enquiry is remotely comparable to the indignation with which the Royal Commissions were received a hundred years ago in Oxford and Cambridge. Nevertheless, it was these Commissions and those which began the conversion of our antiquated mediaeval universities into the great institutions we know today; the universities owe a great debt to Royal Commissions.

Universities form a fairly small and compact society; they realize that the work they are doing is good and they are very well aware of the prestige which they enjoy among the public at large. It is only too easy to assume that all is well and to feel that any enquiry would do nothing to help, and might waste the time of very busy men, but no institution should expect to be the sole judge of its own cause, and many of the questions which Lord Simon propounded seem to me to demand an answer. I see no method by which they can be properly answered unless they are studied by a Royal Commission

* *Universities Quarterly*, vol. 13, nos. 2 and 3.

which could investigate both the organization of the universities themselves and the framework within which they are working. I believe that never since Dr. Pusey so eloquently defended 'the sacerdotal functions of a celibate professoriat' has the need for such an enquiry been as great as it is today.

An enquiry into the size of our universities is long overdue. Lord Simon referred to this subject, but none of the essays which his article provoked seem to me to consider it seriously. The English university world has always been a very small one. At the time of the American War of Independence there were nine universities in the States; we then had two in England. During the last hundred years universities have been founded in large numbers throughout

Country	No. of students in universities	Population	Approx. no of university students *per million* pop.
U.S.A.	2,918,212	175,000,000	16,670
U.S.S.R.	2,013,565	200,200,000	10,060
Argentine	142,000	20,060,000	7,100
Australia	61,879	10,000,000	6,190
Czechoslavakia	79,235	13,287,000	5,960
New Zealand	12,507	2,244,000	5,570
Poland	139,244	27,500,000	5,060
Roumania	81,206	17,490,000	4,640
Canada	72,745	15,970,000	4,550
Finland	18,765	4,356,000	4,310
Italy	212,424	50,000,000	4,250
Bulgaria	31,134	7,630,000	4,080
Spain	117,722	29,089,000	4,050
Yugoslavia	72,267	18,387,000	3,930
France	170,023	43,854,000	3,880
East Germany	64,497	17,300,000	3,730
Switzerland	16,531	5,160,000	3,200
Germany (West)	151,343	50,594,000	3,000
Austria	20,863	7,000,000	2,980
Belgium	25,169	8,950,000	2,810
Egypt	63,761	22,651,000	2,810
Netherlands	30,939	11,094,000	2,810
Denmark	12,447	4,448,000	2,800
Portugal	22,319	900,000	2,480
United Kingdom	90,500	49,812,000	1,815
Ireland	7,670	4,295,264	1,790
Turkey	42,642	24,000,000	1,780
Norway	5,952	3,511,000	1,690

These figures were compiled by U.N.E.S.C.O. in 1957.

the whole world. Fifty years ago Ramsay Muir pointed out that we then had fewer universities in this country in proportion to our population than any other civilized country in Europe with the solitary exception of Turkey. How are we doing today? Lord Simon showed that the proportion of the population of this country in full-time attendance at a university is much smaller than it is in most other countries.

It is quite extraordinary that after 50 years, although we are still doing better than the Turks, we are still almost at the bottom of the table. A new technical university for 15,000 students is to be built in Ankara—it should be open in five or six years' time; Turkey is stirring at last—it may not be at the bottom of the list much longer. Poland is a small country which suffered very much from the war, most of its industry was ruined and it has been oppressed by political problems ever since the end of hostilities, during which it lost many of the ablest of its people. Nevertheless, out of a population of twenty-seven and a half million, about a hundred and forty thousand are now at universities. A population not much more than half as large as ours supports a university population 50 per cent greater than ours. New Zealand and Canada have proportionally far more students than we have—WHY?

Australia already educates three times as many of its young people as we do, but Professor Matheson has just been appointed to be the first vice-chancellor of a new university in Melbourne; he hopes that a small staff will begin to teach in 1961 and that by 1970 he will have at least 12,000 students. No one can foresee how to solve in a decade all the multifarious and formidable problems to be expected in creating a university nearly as big as Oxford and Cambridge put together, but the Australian authorities are prepared to face them as they arise. If the new University is unable to accept the enormous number of students who will seek admission in twelve years' time, there will be a crisis in the educational world of Australia.

How are we to compare our universities with America's? About 40 per cent of English children survive in school to the age of 16. About eleven per cent go to sixth forms and six per cent go to university. In the United States almost all children stay at school until they are 18 years old and 35 per cent went to universities last year. Our university population is about 100,000—theirs about 3,000,000; ours has doubled since 1930 and so has theirs; ours is

likely to rise to 150,000 during the next ten years and theirs to 7,000,000.

There are about 1,840 universities and colleges in America; some have a few dozen students, others as many as 40,000. Some are almost unknown, others are world famous. Perhaps a hundred of them can be described as universities in the sense that we use the word in England. There has always been a great difference between the best and the worst of American universities. I believe that the best of theirs are very much like the best of ours. As for some of the others—well, perhaps their standards are comparable to those which our own ancient universities were prepared to accept from undergraduates fifty or even twenty years ago when many young men who went there in search of a liberal education were not very concerned about pure scholarship. Unfortunately many Englishmen who have seen some of the less distinguished American universities have blandly asserted that our own standards are so much better that we need not be worried by our much smaller numbers. This argument simply will not do any longer. The Americans try to give to their élite as good an opportunity as we give to ours, but in addition they try to give a much better opportunity than we do to a much larger proportion of their population. We have found in Manchester that the quality of our students improves as their numbers increase. In 1870 Mark Pattison complained that the universities couldn't find any more educable students (there were then less than 5,000 undergraduates in England). He would be a bold man who made such a statement today. An American child is three times as likely to go to a university as an English child is to go into a sixth form. In a few years time our youngsters will be competing with Americans for the markets of the world. Surely we could do more to help them.

In some American universities 40 or 50 per cent of the students fail and leave after the first year. English universities are much more careful to restrict admission to students who have a reasonable chance of surviving the course, and regard a large failure rate as evidence of inefficiency and waste. Americans believe much more strongly in the value of a year in a university, even to a man who cannot stay the pace and never gets a degree. Like many other American institutions their universities may be relatively extravagant and inefficient, but they are extremely effective and productive.

We seem to be suffering from a national neurosis which makes

us accept our relative penury without being conscious of it; we seem to believe that if we are doing better than we were then no more should be expected of us, and we never seem to compare our institutions with their counterparts abroad. We have just ceased to make steam locomotives, but we shall be using them for years to come; the Dutch put their last steamer in a museum last year. Our telephone service is expanding more slowly than that of any other country from which data is available; almost every country in Europe has built more new hospitals than we have since the war; our cities still retain scars from bomb damage and our national productivity is rising appallingly slowly. An average English workman produces less than half as much as an American. It is possible that the American educational system has helped to improve the productivity of American industry? Next October we hope to complete a hundred miles of modern road from nowhere to nowhere in particular, and we seem to be quite unaware of the fact that almost all other countries did much more years ago, that many American States open ten times as much new highway every year, and that we are spending less on new roads (per capita) than any other important European country. We shall spend about £80,000,000 on new roads next year; this is far more than we have ever spent before, and the authorities seem to be very proud of themselves, but Western Germany will probably spend six times as much as we do. Why can they afford to be so much more enterprising than we are? We are told to admire the new London Airport, and many of us have come to believe that it is something to be proud of. Few Englishmen realize that in fact it does not handle as many aircraft as the Airport at Little Rock, Arkansas, that transatlantic passengers still use old wooden huts which would suit the bus station in a small provincial town, and that London ranks about eightieth among domestic and international airports of the world.

The world of science and technology has been doubled in size once every 15 years or so ever since Newton's time. This means that three-quarters of the scientists and technologists who have ever lived are alive and practising today. Other countries seem to be accepting the implications of this astonishing fact. Are we?

The English universities contributed nothing to the industrial revolution and in 1902 Reynold remarked that 'excepting only the private boarding schools which we know as Public Schools, there is no Department of English education in which such conspicuous

success has been achieved as in the Technical Evening classes'. These classes have always played and will continue to play a vital part in English education, but surely by now we must admit that modern technology demands university courses, and cannot be taught properly to part-time evening students.

English universities accepted engineering slowly and reluctantly. Almost all other countries which have determined to industrialize themselves as fast as possible have established large specialized institutions of university rank devoted exclusively to the education of scientists and technologists. Why can't we have one in England? The idea was rejected by the Government a few years ago because whatever the merits of such an institution might be it was impracticable to establish one at the time. Since then the Germans have created a technical university in Aachen which is about as big as Oxford or Cambridge and is full of adequately staffed and well equipped buildings. Why should we have to believe that such a development is impossible here? Admirable though the Imperial College, Manchester 'Tech.', Glasgow 'Tech.', our university engineering departments and our new colleges of advanced technology may be, none of them is big enough by Continental standards. It may well be that a technological institution could become too big to be efficient—this is arguable, and no one is prepared to say at what point efficiency begins to decline; but, and this is the point, most authorities in other countries are convinced that there is a minimum size below which no such institution can be really efficient, and this minimum size is very big. The original plan for Aachen was based on the assumption that a technological university needs at least 100 professors (Charlottenburg has 127, and about 9,000 students) if all branches of technology are to be represented in the one institution, so that each department can draw on adequate resources and influence and be influenced by most of modern science and technology. Manchester University has about 6,500 students and 88 professors—so that the number of students per professor is about the same in Charlottenburg or Aachen as it is here, but only half the professors in Manchester are scientists or technologists.

All countries are expanding their universities; we may be expanding ours at a rate which startles us, but is it enough? Are we content to accept this position of relative inferiority to the greater part of the civilized world, or do we not believe in the idea of large scale university education? Perhaps we fear that if all the clever boys

went to college there would be no one left to employ the graduates.

After making all reasonable allowances for variations in standard for our part-time students, and for the different functions which are discharged by universities in different countries, it does seem to me that there is a need for a fundamental enquiry into the nature of a university world which is relatively so much smaller than that of any other big country which pretends to be civilized.

For many years our universities have been able to rely on magnificent teaching in our secondary and grammar schools. We have all become aware of the national shortage of science masters; the appalling inadequacy of the laboratory accommodation in our schools has been shown up by the questionnaire recently organized by the Science Masters' Association. Only eight per cent of the grammar and direct grant schools and 20 per cent of the independent schools have laboratories of adequate standard. Only 44 per cent of schools had labs which reach the minimum standard of the Ministry of Education, and this standard is much lower that that which was advocated by the organizers of the Industrial Fund.

If our universities are obliged to take over any significant part of the syllabus which we now entrust to the schools; if for this or any other reason we are obliged to follow the example of the rest of the world and extend our university courses from three years to four, then indeed we should face disaster. Should the Commissioners study this question too?

We spend nearly six hundred million pounds a year on education in this country; perhaps a third as much as we spend on defence. The Russians spend as much or more on education as they do on defence, and their defence vote is very much bigger than ours. The Americans, spend about $14 billion a year, and are proposing to double it. The President's Scientific Advisory Committee recommends that in future all college students who do not major in science should devote 15 per cent of their time studying science. It is more than 50 years since Joseph Chamberlain remarked 'University competition between States is as potent as competition in building battleships' and Mr. Churchill has recently told us that 'The future of the world is to the highly educated races, who alone can handle the scientific apparatus which is necessary for pre-eminence in peace or survival in war'. Far be it from me to suggest that the scale of university development should be decided for this reason; one may be forgiven for mentioning it in the hope that it might appeal to

some of the people who are responsible for determining national policy.

When the Government is fully persuaded of the importance of any major development it nearly always seems to be able to make the necessary funds available. For example the egg subsidy cost £47·6M last year, we are to fire 30 or 40 Blue Streak missiles which will cost between ½ and 1 million pounds each, during the forthcoming Woomera trials. On the other hand the U.G.C. spent altogether £37,387,000 on English universities (£28,253,000 recurrent expenditure and £9,134,000 non-recurrent grant), and the Department of Scientific and Industrial Research had £9,450,000 in 1958. An extra £80M is to be spent on Technical education during the next five years. Our problem seems to reduce to this. Can we persuade the Treasury that our universities are as important to the community as the egg subsidy?—that the Department of Scientific and Industrial Research is worth as much as the experimental trials of one type of missile or even better, that Education is, let us say, half as important as Defence? If we could do this the whole scale of our university development and (dare we say it?) the whole future of the community might be transformed. Surely there must be some way of conveying such a message to the authorities.

	£
Total U.G.C. expenditure 1956/7	37,387,000
D.S.I.R. grant, 1958 (including £920,000 given by D.S.I.R. to help university research) ...	9,450,000
Egg subsidy	47,600,000
Advertising campaign run by the Egg Marketing Board (to get rid of the eggs)	800,000
Cereal subsidy	52,300,000
Fatstock subsidy	85,700,000
Total cost of Agricultural support	289,400,000
National Health Service (treating diseases) ...	557,000,000
Medical Research Council (finding out how to treat diseases)	3,130,000
Tobacco	979,000,000
Alcoholic beverages	940,000,000
Advertising	350,000,000

I wonder how the Treasury decided on the relative importance of the various items in this table; in particular it would be most

interesting to know how it was decided that we ought to spend five times as much on subsidizing chicken feed as we did on the Department of Scientific and Industrial Research.

It is very probable that the West, and this country in particular, has more to fear in the long run from Russian industry and Russian competition in the markets of the world than it has from Russian arms. It is certain that the uncommitted nations will be swayed in their allegiance by the speed at which the Western and Eastern blocks can help backward countries to industrialize themselves and raise their standard of living. Scientists and technologists are the missionaries of the modern age. The days when a man might quality himself to govern the Empire by studying Greek and Latin verse are over. Few countries want us to administer them, but many want us to help to educate their young people so that they can mechanize their industries. Other civilizations often prefer their own philosophy, their own art, their own literature, and even their own religion to anything we may have to offer them—but, be this as it may, they all admire and envy our science and even more they envy our technology; most of all they envy the more efficient technology of the United States. In 1878 Huxley wrote 'We are entering now upon the most serious struggle for existence to which that country was ever committed. The latter years of the century promise to see us in an industrial war of far more serious import than the military wars of its opening years. . . The situation is grave.' How little we have learnt in 80 years! If we lose our hold on the minds and on the markets of the world our civilization may go before long with a whimper and not with a bang.

Research in Technological Institutions

We have come to accept without question the importance of research in our universities, particularly in the science faculties, but we are apt to forget that for many centuries the universities believed that their only functions were to conserve and transmit the accumulated wisdom of the ages; they resisted any suggestion that they had a duty to try and extend the bounds of human understanding. The Royal Commissions of the 1850's were quite unconcerned with research, Mark Pattison spent most of the '70s in an unsuccessful attempt to pursuade his contemporaries that research is as important as teaching. He complained that 'We have known no higher level of knowledge than so much as is required for teaching.' In 1909

the Chancellor of Oxford University (Lord Curzon) remarked: 'It is only too true that the amount of original work as yet turned out from Oxford is inconsiderable. . . . It is impossible for it to emulate a university like Harvard which has more than 350 post-graduate students in Arts.'

Other English universities were much more enlightened than Oxford in those days and, of course, the changes which have taken place in the last half century are quite astonishing. Nevertheless it is as well to remember that the universities' preoccupation with research has been developed within the life time of many of us, and that it is therefore not surprising that the special problems of technological research in universities have not yet been solved in this country.

If technological research is to be effective, it must often be even more expensive than modern physics. If the universities are to attract the best men in the country, they must provide them—somehow or other—with the best equipment in the country. Any university which attempts to do technological research on a shoe string is bound sooner or later to become an intellectual backwater. The Americans have understood this much more clearly than we have. A series of historical accidents forced them to change completely their whole system of financing scientific and technological research and development, and nowadays they do it much better than we do.

Radar was developed in England in two or three Government laboratories. When the Tizard mission launched the Americans on their development programme it was not entrusted to Government Research Establishments such as Camp Evans and Wright Field, but to a special new laboratory attached to and administered by M.I.T. I believe that this was the first of the great American research programmes to be administered by a university. The Radiation Laboratory was very much like the Telecommunications Research Establishment in this country, and its organization was inspired by ours, but T.R.E. was run by the Ministry of Aircraft Production; the Radiation Lab. was attached to M.I.T. and made use of all the facilities of that great institution; in particular the pre-war experience of the Department of Industrial Co-operation which had administered M.I.T's programme of sponsored research was vitally important.

The Radiation Laboratory was so successful that after the war

the American Government decided to entrust the universities with most of its large scale research and development in the fields of radar and atomic energy; for example the great secret laboratory at Los Alamos was handed over to the University of California, and Argonne to the University of Chicago. Nowadays the Atomic Energy Commission does no research itself, but contracts it all out to universities and one or two large industrial firms.

The Radiation Laboratory died at the end of the war, but from it other laboratories have been created, some of which are still administered by M.I.T. In particular the plans for the Radar Reporting Chain for the defence of the North American Continent were studied in M.I.T. The Lincoln Laboratories have been responsible for the design and development of the whole of the necessary equipment. Large though the Lincoln Laboratories are, they are still administered by M.I.T.

The techniques of inertial navigation which were used by the Nautilus under the Polar Icecap were developed in the Aeronautics Division at M.I.T. The propellants which are used in American rockets were studied in the California Institute of Technology, which is responsible for the administration of the great telescopes at Mount Wilson and Mount Palomar.

Immense research programmes in High Energy Nuclear Physics have been undertaken on behalf of the Government by the Universities of Stanford, California and Harvard. The enormous research station at Brookhaven, which is in some ways comparable to Harwell, is organized and run by a consortium of universities.

The total academic budget of M.I.T. including salaries, maintenance of buildings, etc. was about $19M last year. This is a large sum, but not unreasonable by our standards for an undergraduate population of about 3,600 and nearly 3,000 postgraduate students. But, and this is my point, the Institution spent about $60M last year on research work of various kinds—the Aeronautics Division alone spent $13M. However one converts dollars to pounds, it is clear that M.I.T. must spend more than the £12M or so which all the English universities put together spent on their research programmes last year. Nevertheless, the M.I.T. expects to double its graduate school during the next decade. In 1958 American universities spent about $550M on sponsored research; the Federal Government provided about three-quarters of this sum (perhaps one-tenth of the total spent on research in America that year).

During the last 10 years the Americans have entrusted their universities, and particularly their technological universities, with many more Government research programmes, greatly to the benefit of everyone concerned. In this country the efficiency of our Government Laboratories made this policy unnecessary, but it has led in my opinion to a lack of contact between research and teaching which is greatly to the detriment of the country as a whole. I know that in saying this I am speaking only for a minority of the academic engineers of this country, many of whom feel, and are prepared to maintain with heat, that any change in the structure of the present university system is to be deplored and that the preoccupation of the Americans with large-scale development is made possible only at the expense of what in this country is regarded as their proper function. Suffice it to say that it is the considered opinion of many Americans whose judgment I trust, that despite all the difficulties and complications of their immense research programme, American universities have grown and profited tremendously from it, and that out of their difficulties has come their present strength.

There is much in the American system which we need not envy. One must be impressed by the enterprise and imagination which American universities have shown in studying themselves, their organization and their programmes and making fundamental changes wherever they seemed to be needed. They have been far more critical of themselves than we have ever been, though they have never been prodded by a Royal Commission. Committees of Enquiry have completely reorganized faculties and departments and whole universities.

Enormous research schools can change and dominate a university; to many an Englishman this is sufficient justification for condemning them out of hand. American universities have learnt to accept them and so their undergraduates, research students and staff are at all times aware of the enormous importance and excitement of fundamental research which is conducted on a large scale with a sense of urgency and with the best apparatus which money can buy. Most Americans think that it is absurd that Federal funds can be made available to support the universities only on the pretext that they are being used to defend the Continent. This means that every graduate school in the States is formally dependent on the Defence Vote. In practice the system has been so devised that any University of repute can get support for almost any research project

in which it is interested regardless of its nature. The 'defence of the Continental United States' is an umbrella which shelters the most astonishing mixture of research and development (both pure and applied). Cumbersome though the system may appear, it has worked remarkably well in practice for three reasons. Very large resources are available; the Government has appointed university scientists as administrators, and they and their colleagues have been most understanding and enlightened, and thirdly (and in the opinion of some Americans most important of all) the very untidiness of the organization has meant that there are half a dozen independent sources of funds. Americans would view with dismay a proposal that all research grants should be administered through a single organization like the D.S.I.R. in this country. Lord Adrian has drawn attention to the danger of entrusting too much power to this monolithic (but administratively tidy) organization.

I am sure that the Americans' instinctive mistrust of monopolies makes them wiser than we are.

On the Continent of Europe a completely different organization produces an intimate association between research, teaching and industry, an association which is vital to the success of each and all of them. Senior members of staff of the universities are often members of staff of research stations such as the Max Planck Institutes, and are almost invariably consulted by the big firms; the staff of the research stations and senior industrialists are often professors or 'extraordinary' professors in a local university; for example Herr von Laue is Director of the Max Planck Institute for Physical Chemistry, and Professor Extraordinary in the University of Charlottenburg. Senior men from the research departments of big firms such as Siemens in Berlin are on the staff of the same university. There is invariably an intimate and continuing association between a research station and the university which is nearest to it.

Few European technologists can understand either how or why we attempt to organize the universities in this country without the help of Extraordinary Professors. Perhaps the colleges of advanced technology will have to show the way to the rest of the university world. How, without such men, can we hope to introduce such novel subjects as the design of machine tools to our undergraduates and graduate students? Both Germany and Russia have large research institutes and university departments devoted to this vital subject.

Russia has made extraordinary progress in this field of late. There are a thousand scientists in the main research organization in Moscow, which in collaboration with the universities, is responsible for the education of machine tool designers throughout the country. The whole of Soviet industry is being revolutionized by new machine tools.

It is curious that continental universities have been much slower than ours to admit chemical engineering as a university discipline despite the fact that the Americans have long known it as 'The Fourth Technology'. Our own universities have been similarly reluctant to accept the study of machine tools which was established in Charlottenburg half a century ago.

Large research programmes have been undertaken by technical universities in Europe; for example the University Department of Naval Architecture in Delft has a big ship tank and is responsible for design studies on new Dutch merchant ships. Dr. Larnmeren is Professor of Naval Architecture in charge both of this installation and of the large Dutch testing tank in Wageningen. Most continental technological universities have research or development divisions—some are on the main university campus; some are part of the local university and some are administratively independent. These institutions are staffed by part-time academicians, they are very well equipped and they undertake large research programmes both for the Government and for Industry. Both in Europe and in America the universities finance a large part of their postgraduate work by 'sponsored' research of infinite variety.

In Russia the association between teaching, research and industry seems to be closer than it is anywhere else in the world. It seems to be achieved by exploiting the best features of both the American and European systems. Such collaboration is, of course, bought at a price. It is sometimes said, for example, that although continental professors may know more about local industry than their English counterparts, they know less about their students. This may be true, but before we begin to congratulate ourselves, let us for one moment try to visualize the English system as it might appear to a visitor.

English universities have never been responsible for much of our national technological research and development. I believe they ought to do much more of it, but for the time being they are not equipped to undertake it. Is it not possible, however, to associate them more closely with the work which is being done in

industrial and Government laboratories? Many of these great institutions undertake most valuable and interesting fundamental work, much of which is essentially similar to the programmes which play so important a part in the development of foreign institutes of technology. Some of this work is almost indistinguishable in character from that which is already being done in our universities. For example, the physics department in the Radio Research Establishment, Malvern has exploited its magnificent equipment to study the new 'solid state' devices at very low temperatures. Some most beautiful work is being done in the National Physical Laboratory in Teddington and in the National Engineering Laboratory in East Kilbride (which has cost about six million pounds so far and is splendidly equipped). All of these great institutions seem to me to suffer because of their present separation from the university world; not only does the research itself suffer, but their discoveries are often inadequately appreciated by those people who could learn most from them. Very few university students go there to work; university regulations make it difficult for the students and our academic traditions are opposed to the development of what might appear to be extra mural postgraduate schools even in Government Research Stations which are engaged in 'unclassified' pure research. Our students do not exploit as they should the opportunity of seeing and using the best equipment in England. Many students would gain enormously from day to day contact with problems of importance which are being faced with a sense of urgency by people whose obvious competence has received the tribute of adequate resources.

The National Engineering Laboratory has recently been reorganized and it is to be controlled by a three-man steering committee, which will help the Director. Why should the administration of this lab. not be intimately associated with the Royal College of Science and Technology in Glasgow, which is only a few miles away? Why should we not try the American system in this country as an experiment and amalgamate N.E.L. with Glasgow Tech.?

The fundamental research which has been done in our own universities gives them their greatest claim to intellectual eminence; but it is important to realize that to many young men, particularly to young engineers, fundamental research makes relatively little appeal, and many of them (and they are worthy, estimable and intelligent young men) are far more interested in work which is likely to have significant and perhaps fairly immediate application.

It is quite wrong for the universities to underestimate the intellectual difficulty of development work and to tell such young men to go away. If adequate opportunities were given to our graduate students to work with the best apparatus available in the country, on problems the significance of which was obvious to them, many of them would give of their best and benefit themselves, the universities and the community as a whole.

I realize only too well the tremendous organizational problems which would arise in any attempt to associate universities with non-academic institutions in a matter of such vital importance. The Americans have the advantage of us because of the very rapid growth of their graduate schools—there are about 250,000 graduate students in America; perhaps 10,000 in this country. (An American is as likely to take a Ph.D. as an Englishman is to take a first degree.) Graduate students in America must undergo tuition and take prescribed courses of lectures, so that opportunities for contacts between the student and his professor are provided automatically wherever he works. Inadequate though our resources may be I do not think they are efficiently deployed. English graduate schools might be far more effective if they provided more formal instruction, and I believe that there should be a continuous and automatic exchange of information, of personnel, of ideas, of machinery and of inspiration between the academic world (in which I include both teaching and research), the industrial world and the Government research laboratories.

English universities spend about £12M a year on research. British industry about £85M, but the Government spends about £240M on research for Defence. This represents a higher proportion of the total research of the country than any other Power has felt obliged to accept. Should our Commission consider why this is necessary, or is this question too difficult for even a Royal Commission to solve?

To recapitulate, our universities appear to be content with the situation in which they find themselves. They seem to believe that their expansion programme is as large as they can handle and many of them have let it be known that they do not think that they could recruit either staff or students more quickly than they are doing. On the other hand, it is quite clear that there is a fundamental difference between the basic principles upon which university education is organized here and those which are accepted in most other civilized countries, almost all of which expect as a matter of course to have

a much larger university population than ours. I do not see how this extraordinary difference between British policy and the policy of the rest of the world could be resolved except by enquiries on a scale which could be envisaged only by a Royal Commission.

Secondly, I think that problems of technological education are still under-estimated in this country and that we have never faced the problems of technological research in universities. I do not believe that our resources are large enough, nor do I believe that they are deployed as efficiently as they should be. However satisfied we may be with the situation as it appears to us, we should be deluding ourselves if we thought that all foreign observers were as pleased with our system as we seem to be.

It is no longer true as it may have been once that universities have no other function than to provide a gloss on society; they no longer exist, as once they did, so that wealthy young men can pass a few years in acquiring a certain amount of polish and getting to know each other. The industrial revolution owed nothing to the universities. For the first time in recorded history the survival of the country depends upon the universities; their efficiency is of vital concern to the nation and should be studied in the light of contemporary practice both here and abroad. We cannot assert that the rest of the world is out of step. If a Commission decided that we are right after all, then indeed we should have reason for self-congratulation.

Correction

In the last issue, Poets as Dons, Mr. Patrick Cruttwell was described as a poet. In fact he is a novelist, and his novel, *A Kind of Fighting*, was published this year. We regret this error. Editor, UNIVERSITIES QUARTERLY.

SESQUICENTENNIAL LETTER FROM OXFORD, OHIO

LEO SILBERMAN

University of Chicago

May, 1959.

CONVENTIONS organized by the learned professions as well as business are well-known American institutions. The visiting senator; the soporific speeches and papers; the cocktail party donated by the publishing house catering for the particular group foregathering; the graduates in the lobby looking, in default of national advertising media, for jobs—follow what is a conventional pattern.

But the British visitor to America pricks up his ears when the Mid-western Political Scientists organize their convention this year at Oxford, Ohio. Of all the 21 Oxfords in America—this little university town of 8,000 comes closest to old Oxford, England. High Street (here called 'The Street') must have been like this a century ago. The students are not allowed to bring cars to the town. A most unusual sight it is in America to see them in shorts, on bikes, even on tandems. The students speak of themselves as Oxonians though the university—now with an enrolment comparable to the University of Oxford—is called after the Miami Indians who 150 years ago roamed what was then dense forest lands. It was in 1809 that the Ohio legislature made a land grant of 23,000 acres—two days after Ohio had become a state—to Miami University and Oxford. The original endowment continues. Everyone in the town has his land on lease and pays a dollar a year—which costs more to collect than it yields. The intention has been to match Cambridge, Massachusetts, with a worthy Oxford, Ohio. Dr. Bishop, new from Edinburgh, was its first president, and names oddly foreshadowing famous Oxbridge ones of today, Sumner and Annan, its faculty, at $600 a year. Considering the purchasing power of money, salaries have not substantially gone up, but the campus has. Long lawns, sports fields and the Natatorium, laboratories and for the sesquicentenary a new chapel are a delight to eye, especially at this time of year, with the redbud in bloom.

A specially festive look is taken on at present as the sesquicentenary is being expertly arranged. The young man in charge has done 46 other centenaries in other small towns in America. He is but one of 60 in a firm founded more than a half century ago to mount such commemorations. By the look of the organization chart with its proliferating committees aiming to bring in everyone in the town as a participant, they have worked up a splendid routine and can have, like the young organizer himself with his ideas for everyone, no counterpart in any other part of the world. Oxford, Ohio may have High Street in common with Oxford, England, but the warm smile that greeted an 'old fogey' (as he called himself) when asking if there was something he could do, was all its own. Of course, he could be one of the firemen for the fire of 1864 in the pageant, if he grew a beard. Once beards are grown class differences disappear, the organizer tells you, so that the Committee of the Brothers of the Bush is one of the most important of the 85 committees. Legal matters; how and whom to invite on to the presidium, the ball, the coronation of the queen, the model airplane display, the archers, the teas, are enumerated with useful do's and don'ts in the organizer's rule book. America has no saint's days for her towns, no harvesting festivals, no ancient fairs so that conventions and, as often as they can be arranged, centenaries (and sesqui- and bicentenaries) make excellent substitutes. The Izaak Walton League and the cook school will bring themselves to general notice. The kids can put on war paints and howl like real Miamis. Old Oxonians will foregather. The university class of '09 with professors emeritus will come in force. The up-down-up history of the University will be reviewed in long addresses: the first faculty of 1823; the rows between President Bishop and old Guff, the famous M'Guffey, whose *Readers* sold in the millions in the last century with their appealing 'God bless the Industrious' and the stories—which have come true—of the clever boy who married the merchant's daughter and is now rich; the decline of Greek and the rise of the Greek letter fraternities, many of whom were founded right here. There will be much self-congratulation and with good cause.

Dimensions, the literary magazine of the highbrow students, may sigh, as in Oxford, England, the same group sighs, that the place has run down and is now the refuge of the dreary. The spruce, neatly attired students are not of the same material as the farm lads who nailed their lecturers in one snowy night, so that the entire Greek

class had to be expelled. Archbishop Whateley (sometime professor at Oxford, England and author of the famous *Logic*) was burnt in effigy because he dulled the 19th century syllabuses—an action which would have pleased the witty divine had he ever heard of it. No Robert Owen could today be invited to address the Ohio Legislature on socialism. Probably no Rationalist Association would find favour with the trustees today. Though this was a presbyterian foundation, there was in the spacious past much broad-mindedness among much sternness: 'The students,' says the book of rules in M'Guffey's day, 'are to consider themselves as young gentlemen associated for the purpose of improvement. They are to treat the President and Professors with profound respect.' No doubt they do today. In fact, in this week's celebration they will not be particularly in evidence, seriously and deep in their examinations as modern Americans will be.

Why put the sesquicentennial week just now in June? Because Ohio Oxonians share with Oxonians at the Isis a damp summer. The centenary organizers and the University do not want the floats (they cost $500 apiece) to be drenched, nor the Ladies of the Sunbonnet Committee nor the rich alumni disappointed. As already said, they know their business in flourishing Oxford, Ohio.

THE AFRICAN STUDENT AND CAMPUS FRATERNITIES

An Explanatory Exposé

A. H. M. KIRK-GREENE

HAVING discussed this topic with a number of West and East African students at various American universities, and having had the opportunity to visit, *inter alia*, one of the country's leading Negro colleges which has long maintained a proud record of association with West African students, I should like to set forth an initial assessment of the African student's attitude towards the fraternity system and hazing. Let me admit the *arrière-pensée*. I write primarily in the hope both of encouraging African students at, or graduates from, American colleges to put forward their own views in more intimacy and detail than my preliminary observations allow, and of developing this discussion with student friends from Africa's university colleges on my return from the United States. For, to borrow from the preface of Professor Coleman's brilliant analysis of nationalism in Nigeria, *Background to Nationalism*, 'an exploratory study invites, and ought to produce, corrections in fact and in judgment; indeed, it is but an invitation to further research'.

First, the terms themselves. The standard American dictionary, noting that 'hazing' is essentially a concept of American campus life, defines it thus: 'In schools, colleges, etc., to harass or annoy by playing abusive or ridiculous tricks upon, as in initiations.'

A review of the 'fraternity' system calls for an essay, even a book, in itself. But for the purpose of this article, a skeleton account of the formation and function of fraternities must suffice. Fraternities are the social clubs that flourish to varying degrees on the campus of most of the leading universities of the United States. These local branches are chapters of the national Pan-Hellenic societies. Fraternities are named after Greek letters (their significance need not concern us here), such as Sigma Alpha Epsilon, Beta Theta Pi, Alpha Tau Omega, etc. There are parallel societies for women students known as sororities: for example, Alpha Chi Omega, Kappa Alpha Theta, etc. 'Thriving in institutions', writes N. P. Gist, whose

Secret Societies is a valuable cultural study of fraternalism in all its American ramifications, 'which are at the same time products of democratic education and defenders of democratic idealisms, the fraternities and sororities have perhaps quite unwittingly produced, or at least reflected, a form of social stratification on college campuses which, in the opinion of certain critics, is antithetical to the ideals of democracy.'

A representative joining procedure goes like this. At the beginning of the academic year, most (and thereby discrimination is already present) freshmen take part in 'rush week', visiting each fraternity house in a sequence of parties. In theory this gives a freshman a chance to see which fraternity he would like to apply to for election, but in fact it is unambiguously the fraternity that decides—often in advance, on grounds of the influence and/or affluence of the freshman's family, especially if his father or uncle happens to be a member of that fraternity—whom it wishes to accept for membership. Above all, this rush week allows them time to look over the new intake: other things being equal, preference is given to men who were outstanding in their high school activities. The real significance of this evaluation was tartly summed up by a campus commentator of the '30's, who, in an article neatly entitled *The Nobility of the Campus,* declared that the virtues comprised 'anything non-scholastic, from writing a class poem to being fullback on the football team, but naturally football and saxophone players are preferred to poets'.[1]

At the end of rush week freshmen 'pledge' the fraternities of their choice. Their applications are then scrutinized, together with a devastatingly candid review of the impressions the freshmen made at the presentation parties by the fraternity members, and the new year's pledges are invited to become members of a fraternity. Fraternity members wear a pledge button, generally a fraternity pin, for mutual recognition. Not everybody wishes to join a fraternity. In one university that I worked at, where the fraternity system plays an unusually prominent part in campus life, there were approximately 500 pledges out of 650 rushees.

After pledging, the freshmen are still on probation till about half term. During these weeks they have been subjected to a severe discipline. Fines are imposed for minor infractions of good manners in the house's dining room—one pre-war scale rose from 1s. for lateness at meals through 2s. for eating with a knife to 5s. for

drinking from a saucer. Subservience is the best word to describe other elements of this discipline, such as the duty of polishing the shoes of a senior fraternity member, or the obligation to work on pre-examination revision under the supervision of another undergraduate in a room at the fraternity house. Misbehaviour or a tendency to act uppity will result in being beaten with a paddle by fraternity members.

Then, after six weeks or so comes proving time: hazing.

Hazing, specifically banned these days by the Inter-fraternity Councils on many campuses, takes the form of the actives (sophomore, junior and senior members of a fraternity, that is to say, undergraduates in their second, third and fourth years) inflicting some kind of punishment on the pledges. 'Any sort of physical force, violence or aggravation' ran a recent definition by the Pan-Hellenic Society at another university where I was lecturing, 'taking place between a pledge and an active is hazing'. The principle behind this behaviour is to put the pledge through the hoop and to assess his calibre as a potential fraternity member by exposing him to extreme tests of fortitude, initiative or moral courage. From the trials and tribulations that mark this initiation, the term 'hell week' has gained currency to describe the hazing period.

Some of the classic hazes, although their decease is lamented by alumni of the we-had-to-do-it-why-should-the-younger-generation-be-cuddled-like-sissies genre, were marked by a wantonness and at times a sadism that have little to commend them. Renewed support for the traditional attitude that hazing enhances the group's spirit and the prestige of the body into which the pledge is being admitted has come from a recent project at one of the West Coast universities where it was found, to quote a report on the experiment, 'the more embarrassing an initiation the more an initiate was forced to think highly of the group'. To many African students, such a conclusion is open to serious argument. Pledge pranks—the word may sound a little mild in view of what follows—reached their zenith/nadir (depending upon your alumnic stand on hazing) in the '20's when resulting tragedies hit the headlines. At one university a freshman disappeared during hell week and it was some time before his body was found tied to a pier in a nearby lake where the tide had drowned him. At another college a pledge was killed by an electric shock.

These are extreme examples. Yet instances on a more humane level are, if no longer physically dangerous, often characterized by

degrading or infantile elements, and thereby reveal themselves as no less repellent to African students. For instance, to quote from actual incidents, the test may be puerile, such as making a pledge catch raw eggs in his mouth when kneeling with hands tied behind his back, or would-be humorous, such as obtaining a written declaration of love from the head of a nearby seminary to the Mother Superior of a neighbouring convent. Again, it may be humiliating, such as compelling a candidate to dress in women's clothes, bend over, propel a ground-nut with his nose for several hundred yards, the while pursued by boys and girls armed with paddles and urging the initiate to sing a song as he crawls forward. Others are pointlessly rigorous, like having to play a round of golf in a below-zero temperature, pyjama-clad. Or they simply constitute a public nuisance, such as obliging a student to secure an invitation to dinner with a Dean's wife on a certain day, or kidnapping the pledge aboard an aeroplane that will abandon him penniless, 500 miles from campus and 12 hours before classes are due to resume.

The post-war reaction to these severe forms of hazing was characterized in a recent article in the *New York Times* under the heading 'GIs Struck A Blow'. These ex-servicemen, many of them returning to campus to complete or even embark on their education, maintained that nothing could excel their experiences in the foxholes of Europe or the jungles of the Pacific campaigns, and they were reluctant to allow sophomore striplings who had escaped military service to try and go one better.

It is undeniable that the fraternities carry considerable social prestige, though much of this may operate in the fields of 'dating' girls and subsequent business connections, in which activities the African student, for one reason or another, is not always immediately involved.

From this outline of the disciplinary subservience and initiatory hazing demanded for membership of a fraternity, it is not difficult to understand why the average African student in America shows little sympathy for, or desire to join, a college fraternity.

Many of the features of hazing are, of course, reminiscent of the prefect-fag system of the British public schools, and it is acknowledged that the African boys at these schools have accepted the system no differently from their typical British classmates. Some African students point out the affinity between a prefect-fag and a chief-commoner social stratification. But there is a world of differ-

ence between the West African schoolboy, plunged at the age of thirteen, a little lost, into an English public school, where the secret of survival is to conform and never to rebel against tradition, and the West African student who enters an American university at the age of twenty-plus. Furthermore, not only is the African student frequently three years older than his American counterpart who so desperately seeks the ready-made in-group that a fraternity offers, approximating to Riesman's 'other-directed' or peer-group, but he is in a way atypical in that he is at an American university at all. Again, as Bennett comments, 'the emphasis upon student "guidance" and the parent-surrogate role of the American university may tend to reinforce certain preconceptions [of the foreign student] about the immaturity of the American undergraduate and his lack of political sophistication'.[2]

For the purpose of this argument, extraneous though influential factors such as costs (a joining fee of $1,000 is not unknown, though that is an exceptional figure; $150 is perhaps a more likely sum) or colour bar (many of the college fraternities are presently engaged in a struggle with national headquarters in an attempt to abolish discriminatory restrictions on pledging) need not be taken into account. Significant as they are, they are material reasons, whereas we are here concentrating on the psychological explanations of the African students' lack of interest in fraternity membership.

Apart, then, from the questions of cost and colour and of the degree to which various social and racial types are welcomed or rejected in the intimate student relationship inherent in the fraternity system, it is my impression that the African student has other reasons for so rarely pledging a fraternity. These appear to make up a complex of psychological reactions. Sometimes the African student looks down on hazing as degrading or childish. More often than not he is not only physically older, but he is also morally maturer than his American fellow freshman, nearer the more obviously adult and independent undergraduate in a European university. Africans have told me that they are shocked by the general level of conversation and personal narrative in the dormitories. They find American undergraduates' conversation topics vulgar and their experience echoes that of the Japanese student informant (quoted by Bennett) who without hesitation described his *first* impressions after one month on an American campus thus: 'my first discussions with American boys in the dormitory were on sex'.

It was, I think, Stephen Leacock who said, not altogether with his tongue in his cheek, that for the *foreign* student a dormitory experience is a more potent instrument of American education than either the college library or the intellectual intercourse with faculty members.

Again, the African student is, by the very nature of things, a foreign student who cannot be expected to immerse himself in the over-emphasized sentimental and patriotic worship of the Alma Mater to the same extent that the home-undergraduate does. Often the African student considers the very demanding social programme of fraternity life as a waste of time and of the money saved, at considerable personal and family sacrifice, to bring him so far for what he must, above all, take home—a degree or diploma. 'We feel,' writes Bennett, 'that it is entirely healthy to find these visitors more interested in the academic rather than the social functions of a university,' which too often ignores the sophisticated needs and aspirations of the foreign student and whose 'emphasis on this area tends to conceal the genuine scholarly contributions and atmosphere of the university—that part of a university which means the most to perhaps a majority of foreign visitors.'

Sometimes the African student may, so they assure me, argue, understandably if illogically, that since the fraternity system is voluntary, it is not *per se* good for him, and if it were really a profitable and integral part of his education abroad the college administration would officially encourage, and even prescribe, his participation. He may, too, shy away from the uncouth ceremonies because he is perhaps unconsciously reacting to a situation that is unpleasantly close to the tribal background of stereotype *rites de passage*, from whose influence he is, whether he realizes it or not, so often seeking to dissociate himself. Indeed, there is an attractive field for research into the relationship between the campus fraternities and the secret societies of Africa, on which an excellent preliminary study has been made by Gist (already referred to).

And despite the personal hiatus between the Negro and African student which, while not germane to the subject of this paper, is too openly resented by African students not to mention here *en passant*, what I have said about the African shunning of fraternities is no less true in the predominantly Negro colleges. In these institutions the hazing tends to be even tougher, due perhaps to the fact that fraternities are of more recent foundation. Such an out-

Heroding Herod phenomenon is not, of course, unknown in parallel governmental, religious and personal situations.

In the context of our discussion, of prime importance as evidence is the experience of Dr. Nkrumah when he was at Lincoln College, Pennsylvania:

> It was a source of wonder to me that after the gruelling initiation ceremony members were not left with permanent marks of membership. I remember it as one long period of torture and humiliation, the most memorable moments being when my trousers were ripped off in front of everyone, when I was chased like a fox by the hounds across fields, captured, beaten and then pushed blindfolded through a hedge. I must admit that the ordeal nearly got the better of me.
>
> (*Ghana*).

This is apparently not the kind of experience to which the African student willingly exposes himself, save in the interests of the most cogent political motives: not for any reasons of physical fear, but for the psychological explanations that have been considered earlier. And now that there are so many more African students in American universities than there were at the time of Dr. Nkrumah's education, there is less compulsion for total integration and a greater feeling of African cohesion in order to express the new 'African personality' among the students.

Dr. Nkrumah's testimony would appear to lend credit to my thesis of African antipathy to fraternities, a phenomenon which is the more unexpected when one recalls the zeal of the African student in his home and European universities for founding societies and for multiple membership of existing ones. In the same vein, it is well known how the American Negro loves his lodges. 'In Harlem,' writes James W. Johnson in *Black Manhattan*, 'as in all American Negro communities, the fraternal bodies fill an important place. These fraternities, too, are in a very large degree social organizations, but they also have an economic feature.' But at fraternities on the campus and their concomitant hazings our African student begs to differ.

Finally, it may be noted that the adult aspect of the African student's disapproval or despising of the fraternity system as exemplified in its hazing ceremonies receives growing support from many American undergraduates. This is shown by the way that on several campuses 'hell week' has been converted into 'help week',

when the pledges are called upon to perform tasks of value to the community. Again, it is seen in an extract from the editorial of an undergraduate newspaper on a campus that is well known for its highly valued fraternity and sorority set-up:[3]

> an educational institution such as this can have no truck with those social organizations whose practices are so completely opposite to the goals of the university, and who nullify academic and intellectual advances with the idiotic preoccupations of idle and misguided minds in the latest sweat sessions. Unless the Greek system at this university winds up fast, that increasingly strong minority of faculty members who believe the whole fraternity system to be hogwash are going to be proved right, and also become a majority. The values of mutual exchange of ideas and the other high-sounding goals which an intelligent fraternity system professes are being forfeited by the lowest common denominator element in every house which prevails when discussions of hazing, walk-outs, kidnapping or hell nights take place.

This, I suggest, provides an apt conclusion to this exploratory exposé; for, despite its unmistakable brand of oratory which, maybe by its very self-assuredness and genuineness, stamps student declarations the world over, it does put across the view of what many of us would like to think of as 'the reasonable man'—who is, I am delighted to find, in this context so often identifiable with the African student.

NOTES

[1] 'The Nobility of the Campus', N. A. Crawford, *American Mercury*, October, 1930.

[2] *In Search of Identity: The Japanese Overseas Scholar in America and Japan*, John W. Bennett and others, 1958, p. 308. Much of Appendix C to this most interesting study reflects an attitude which could, *mutatis mutandis*, be applied to African students on a foreign campus.

[3] For obvious reasons, it would be indiscreet to document this quotation.

'WHAT IS MATHEMATICS?'

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Mathematics is thought moving in the sphere of complete abstraction from any particular instance of what it is talking about. So far is this view of mathematics from being obvious, that we can easily assure ourselves that it is not, even now, generally understood.
(A. N. Whitehead, *Science in the Modern World*.)

'WHAT IS MATHEMATICS?' is an interesting and apparently simple question which is seldom answered. Instead the questioner is usually invited to give his attention to some of the typical elementary problems which come within the range of his ability and knowledge and so to learn what mathematics is by actually doing some. Such tactics are, of course, very sound indeed; and in the case of Courant and Robbins' book *What is Mathematics?* the result is unimpeachable. Mathematicians hesitate to discuss the nature of their subject in general and non-technical terms because of their well founded conviction that, particularly in their field, experience should precede reflection. But nowadays mathematics has become so much part of science and technology that more people than ever before have some mathematical experience; so perhaps there is greater need and occasion to discuss its nature.

There are, of course, serious monographs devoted to the study of the nature of mathematics;[1] and, compared with these, this article appears as the journalism which it avowedly is: but it is a necessary journalism. *Metamathematics*, as the study of the nature of mathematics is sometimes called, is a highly technical subject whose pursuit requires considerable mathematical ability and perhaps special aptitudes as well. It is a necessary study and its importance will, no doubt, increase; but its valuable contributions to the understanding of mathematics are, however, of a peculiar sort. Metamathematics has been concerned, for example, with the structure of mathematical systems as *concatenations of propositions derived by logical deduction from a system of axioms*; but, though it has undoubtedly contributed much to the widespread understanding and

exploitation of this form of presentation of mathematics, it did not discover it: Euclid's *Elements* are still an obvious example of this approach. Much of the work that goes on at the superstructure of mathematics is remarkably unaffected by work on the foundations; so that the metamathematical problems about infinite sets and about arguments involving an infinite number of steps, while important in certain places, are also highly localized in their relevance. In the study of the logical characteristics of certain mathematical systems, metamathematics 'comes after' mathematics, because evidently the systems have to exist before they can be analysed. Finally it must be observed that metamathematicians are divided into different schools of thought—the formalist and the intuitionist[2]—whose differences are not likely to be easily reconciled: they are not those differences of personal judgment which are common among scientists and mathematicians, but basic differences of approach of a sort not found in mathematics itself.

Mathematics enters into human life in a variety of ways, whose nature is not usually considered in metamathematics. First of all mathematics must be recognized as a humanist study: mathematics can be regarded as the exploration in a certain direction of the furthest reaches of the human mind; and as a pleasurable pursuit, it cannot be considered otherwise than as giving rise to desirable states of mind. The influence of mathematics on philosophy has been considerable, both through the particular sensitivities which mathematics has given to some philosophers and through its influence on logical theory, as in the rise of mathematical logic and logical atomism.[3] From the time of the Greeks mathematics has been the language of science; and today the picture of the world of atomic and nuclear physics is a mathematical one and cannot be satisfactorily drawn in any other medium. Since mathematics enters so much into present-day science and technology, the amount of mathematical skill which can be mobilized is one of the limiting factors in the technical development of our society. The understanding in practical detail and with contemporary relevance of how mathematics enters in its diverse ways into human affairs is therefore of considerable importance; and it is here proposed that the study of such involvement should be called the *Analytics of Mathematics*, not so much to denote a new discovery as to underline the importance of something which already exists. There is, of course, already a great deal of understanding in universities, laboratories and industry of the importance

and use of mathematics; but just because mathematics is becoming so involved with practical affairs, there is a danger that its true nature and the source of its fruitfulness may become obscured.

To be mathematical is to be 'mental', for it is evident that the distinguishing characteristic of a mathematician is the ability to think in a particular and exacting way. What then is mathematical thinking? First of all it is important to realize that mathematical thinking involves a great variety of kinds of mental acts, and that what is going on at one particular time in a mathematician's mind may be very complex indeed. The end to which mathematical thinking is directed is the construction of mathematical systems; and one of the activities of a mathematician is to contemplate such systems when they have been constructed. This act of contemplation is partly a matter of memory, but not entirely so for a mathematically trained mind has developed certain basic mathematical skills which guide it in filling in the gaps: further, the highly organized nature of a mathematical system also assists and points the way. Poincaré admitted that playing chess made too many demands on his memory, though clearly this was not the case with mathematics; and conversely the student who tries to 'memorize proofs' without acquiring the basic skills involved is likely to find that too much is being required of his memory.

One of the basic units of such mathematical reflection is 'going over a proof', during which the mind entertains a number of propositions in a succession dictated by considerations of logic and ultimately arrives at a conclusion, and all the while the logic of the proof is inspected to ensure that it is valid. (The writing out of mathematical propositions serves, in the first instance, as an aid to the memory of their author and only secondarily as a means of communication: as well, of course, mathematical symbolism constitutes an aid to mathematical thinking.) The result established in this way is usually called a *theorem*—an important proposition of the system; and the system itself consists of chains of such theorems, linked and cross-linked with each other by the mental process of logical deduction. Such a sequence of propositions must start somewhere and its initial and underived propositions are called its (non-logical) *axioms*. A mathematician, skilled in a particular branch of mathematics, is able to enumerate the axioms of the system and to guide his mind, in logical order, through the theorems which can be derived from them; something like this happens too when a mathe-

matician gives a formal course of lectures. (The aim of a mathematical lecture is not only to impart information, but also, by inducing the minds of the audience to go through the intellectual processes involved, to develop in them the mathematical skills required; for the invention of printing has not made lectures in mathematics unnecessary!)

A branch of mathematics can grow by the addition of new theorems. There is, of course, no rule for the discovery of a new theorem; it is the result of a creative act on the part of a mathematician. The mental processes surrounding such a discovery are evidently different from the less difficult action of reflecting on a known piece of mathematics: out of confused and hesitant thinking a clear line of deductive reasoning appears by mental processes not very well understood.[4] Sometimes the discovery of a new theorem makes possible and desirable the whole reorganization of a branch of mathematics, so that the sequences of theorems become different and the proofs have to be altered accordingly. A mathematician is not only interested in theorems and their proof: he is also interested that the proof should be as neat, clear, and succinct as possible and further that the theorems should be organized in sequences which are both logical and as elegant as possible.

What are these mathematical systems and in what sense are they said to be 'constructed'? They are constructed, of course, by mathematicians thinking mathematically and writing out their thoughts, so that ultimately a sequence of propositions has been established in the mind of at least one mathematician and communicated to others by a book or monograph, which contains not only the propositions of the theory but usually various remarks explaining the direction of the argument and otherwise directing the comprehension of the reader. Without the active and trained mind of a mathematician considering it, the printed page is sterile—it is only paper with marks on it; so that it is reasonable to regard a mathematical system as existing only in the minds of mathematicians: books serve to maintain and create such systems in the minds of mathematicians.

Mathematical thinking is distinguished from that which produces poetry, novels and scientific theories by being abstract: mathematicians are not concerned with the fact that two apples and two apples together make four apples, but with the fact that $2+2=4$; and this distinction is not trivial. There can be considerable discussion about the nature of mathematical objects (they are certainly

not apples); but there can be little doubt that their relation to the physical world is not so simple as that sometimes suggested by the view that mathematics is the language of science. Mathematical thinking is abstract without necessarily being an immediate abstraction from things occurring in the physical world, so that the range of mathematics is more extensive than that suggested by the physical world: mathematicians can talk accurately about 'things' which have no physical counterpart. It may even be wrong to attempt to awaken and stimulate interest in mathematics in the young by concentrating upon 'everyday' mathematics alone, for in so doing the ability and desire to think abstractly may be suppressed: carpentry may be an aid to visualizing Euclid's theorems, but it is not likely to teach the meaning of Q.E.D.

The objects considered in a mathematical theory are characterized completely by the simple relations which are postulated to exist between them. 'Let us suppose' begins a mathematician 'that $A_1, A_2, \ldots, A_n$ are n objects such that any pair of them uniquely determines (or marks out) a third one of them.' Here a simple set of relationships is postulated for these objects, and without these they have no significance; and from such beginnings are built large, important and even useful branches of mathematics! The relations considered by mathematics are of a particularly simple kind; and it is this simplicity which makes their consideration difficult for so many people, whose minds are nevertheless capable of dealing with the vast complexities of everyday life.

Of course complex mathematical systems exist—indeed simple systems are only of limited interest; but the more complex systems are usually built up by combining and overlaying simple systems with each other in ways suggested by their mathematical suitability and fruitfulness, and not by their immediate application to the physical world. Nevertheless, the fact remains that some of these systems are capable of powerful application to the physical world, particularly, but not entirely, in physics. Further the minds which do mathematical thinking are involved, to say the least of it, with the physical world; and their obvious function is to deal with everyday matters. Therefore, before it can be assumed that mathematical ability is an 'extra', a new stage in human development, an attempt should be made to explain it in terms of ordinary mental processes.

Perhaps a clue to this problem can be found in the vocabulary of mathematics which, if the technical names for things are not counted,

is remarkably small indeed, particularly in the most advanced work: mathematical texts have no purple passages and most of the variety in their vocabulary and the more 'human' words and phrases are to be found in the explanations, directions and encouragements to the readers rather than in the actual mathematical arguments themselves. The words and phrases most frequently used in mathematics express the very simple relationships which may exist between objects of the physical world. Mathematics is about these simple relationships and combinations of them; the physical world contains objects which possess these relationships in profusion—usually so profusely that mathematicians are unable to deal with them; but in certain situations a branch of mathematics is applicable, and then it correlates the properties of the physical objects with great power indeed.

If anything like this is the case, then mathematical ability arises when a mind develops the facility to think efficiently and for relatively long periods about the simple relationships which can exist between objects, and to do this without particular regard for the objects themselves. Usually a mind deals with a welter of complicated relationships and objects; but a normal mind also possesses the ability to think simply about simple things: a mathematical 'bent' consists in doing this supremely well. A mind becomes mathematical when it can shake itself free from considering the relationships existing between physical objects and consider only the relationships themselves. Thus mathematicians are free to build their own intellectual structures and at the same time to find, as a mild but pleasant surprise, that some of their thoughts are useful.

Events have passed an ironic comment on the famous toast of pure mathematicians: *Here's to the next theorem and may it be no use to anybody.* In the last hundred years there has hardly been a scientific advance which has taken mathematicians by surprise for nearly always the mathematical theory for its formulation has existed already. But naturally and quite rightly the pure mathematicians are unrepentant; for, if by not trying to be useful, they have laid the foundations of our present situation, they are naturally fearful of what would happen if they tried. Nowadays there is a general willingness on the part of scientists to accept any help mathematics can give: recently there has been a rash of books with titles like *Mathematics for Anthropologists.* Nevertheless, it is doubtful if any of the sciences have yet felt and responded to the

full impact of *mathematics as a way of thinking*; the essential nature of mathematics is not to be found in the tools it supplies to other trades but in mathematics itself.

There can be no doubt that mathematical thinking is a thing apart: every science is necessarily and inevitably different from mathematics. But it is unreasonable to suggest that the criteria and ideals which have been developed to guide and control mathematical thinking may have some value and significance outside mathematics. There is the mathematicians' insistence that the basic truths of mathematics, the theorems, should be clearly, fully and accurately stated, that definitions should be complete and unambiguous, and that illustration and proof should not be confused. There is the fact, inevitable in mathematics and sometimes possible elsewhere, that its assertions are ordered in a formal deductive system, in which assumptions and conclusions are naturally distinguished. There is the concern not only that a mathematical theory should be logical and rigorous, but that the pattern of its development should be as concise and elegant as possible and, as well, should be continually subjected to revision; and there is the belief that if the matter is not as clear, concise and elegant as possible, then not only is there a failure in 'style' but there is also a departure from fundamental ideals. These, though many may not think it so, are the virtues which come naturally into the work of pure mathematicians. They are, perhaps, to be envied that their work readily lends itself to such ideals; but the possibility cannot be overlooked that the partial realization in other subjects of these ideals may yet prove to be the most outstanding application of pure mathematics.

NOTES

[1] See, for example:
Kleene, S. C., *Introduction to Metamathematics*, North-Holland Publishing Company, Amsterdam, 1952.
Weyl, Hermann, *The Philosophy of Mathematics and Natural Science*, Princeton U.P., 1949.
Wilder, R. L., *The Foundations of Mathematics*, John Wiley and Sons, New York, 1952.

[2] See e.g. Heything, A., *Intuitionism: An Introduction*, North-Holland Publishing Company, Amsterdam, 1956.

[3] See e.g. Urmson, J. O., *Philosophical Analysis*, O.U.P., 1956.

[4] See e.g. Hadamard, Jacques, *The Psychology of Invention in the Mathematical Field*, Princeton U.P. and Dover Publications Inc., U.S.A., 1945.

UNIVERSITY STUDENT, 1953

II. SCHOOLING

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THE first of this short series of papers*[1] sketched the profile of the 1953 undergraduate entry at University College, London: 551 students. This second paper will cover the 470 home students who were born in 1931 or later (Average Age Home Students: A.A.H.S.). The data on which these papers are based was drawn partly from the College records, and partly from a postal questionnaire circulated to students soon after they had left College; 85 per cent of the entry had replied.

In presenting the sort of material here studied, both in this and future papers, the numbers we shall deal with are often quite small, and are unfit for an elegant statistical approach with repeated significance tests. Here the simple data, with percentages, will be given; any conclusions that may be suggested should, therefore, be treated with reserve. Nonetheless, it will be found that some fairly consistent pictures emerge, and in the absence of more conclusive evidence, they may be thought clear enough both to be of some practical interest to university teachers, and to be pointers for further research.

In the first paper probably the most striking item was that of the different failure rates for students coming from different types of school. Those from the independent schools (i.e. fee-paying) had a failure rate some two and a half times that of those from the grammar schools and direct grant schools, 27 per cent as against 11 per cent. Table I shows these rates for the A.A.H.S. group. This paper will be devoted to a more detailed study of the differences between students from the different school backgrounds.

* It is regretted, by an error in adding proof corrections, that the name of John Hopkins, Ph.D. (Yately Research Assistant, Student Health Association, University College, London), which should have followed that of Dr. Malleson as joint author of the initial paper of this series, was omitted.

TABLE I. SCHOOLING AND FAILURE RATES

Schooling	Entry	Not graduating	Failure rate
Grammar*	325	36	11%
Direct grant	56	6	11%
Independent	89	24	27%
Total	470	66	14%

* Includes voluntary controlled, voluntary aided, and transitionally assisted schools.

Academic category and schooling

The degrees obtained by students from the different school backgrounds are shown in table II. As well as having a smaller failure rate, a larger proportion of those from grammar schools obtained first honours: 11 per cent as opposed to 3 per cent from the independent schools; the direct grant school group was intermediate with 9 per cent. The grammar school group also had a higher proportion accepted for postgraduate study at the College: 15 per cent as against 7 per cent, the direct grant group being intermediate with 9 per cent.

TABLE II. SCHOOLING AND DEGREES OBTAINED

Schooling	Entry	First Hon.	IIu/c*	IIa	IIb	III	Accepted as P.G.
Grammar	325	35 (11%)	21	52	105	76	50 (15%)
Direct grant	56	5 (9%)	4	7	21	13	5 (9%)
Independent	89	3 (3%)	10	10	30	12	6 (7%)

* Unclassified.

For the purposes of investigation, the degree obtained is not the only criterion of the academically proficient student. As shown in the first paper, nearly one-third of the students who were accepted to do postgraduate degrees, and so were presumably regarded highly by their departments, obtained only third or lower second degrees. A classification encompassing this is thought to be most appropriate to this paper. Accordingly each student has been placed in an 'academic category':

Academic cream: all those who got first and upper second degrees, and all who were accepted to read for postgraduate degrees. There were 133 of this category, 28 per cent of the A.A.H.S. entry.

Average: all those who obtained unclassified or lower second degrees, but excepting those who were accepted as postgraduates. There were 177 of this category, 38 per cent of the A.A.H.S. entry.

Poor: all those who got third honour or pass degrees, again excepting those who were accepted as postgraduates. There were 94 of this category, 20 per cent of the A.A.H.S. entry.

Failures: all those who failed to graduate, for whatever reason and at whatever stage in their course. As shown in Table I there were 66 of these, 14 per cent of the A.A.H.S. entry.

Table III shows the relationship between schooling and academic category. It is interesting that, whilst a higher percentage of independent school students are in the failure category, 27 per cent as against 11 per cent, a lower percentage are in the 'poor' category, 13 per cent as against 21 per cent. It is not immediately easy to

TABLE III. SCHOOLING AND ACADEMIC CATEGORY

	Ac. cream	Average	Poor	Failure
Grammar	106 (33%)	114 (35%)	69 (21%)	36 (11%)
Direct grant	12 (21%)	25 (45%)	13 (23%)	6 (11%)
Independent	15 (17%)	38 (43%)	12 (13%)	24 (27%)

suggest any explanation for this. If the 'poor' and the 'failure' categories are taken together, the difference between the independent and grammar school groups appears reduced, but it is not abolished, 40 per cent as against 32 per cent. As well, the grammar schools entry yields a larger proportion of 'academic cream', 33 per cent as against 17 per cent.

First choice of university

It will be recalled that this was dealt with in the first paper. It had been suggested that the best of the independent schools were going to the classical universities, and the College was getting only those who had been rejected there. Whilst nothing could be said about the first contention, the second did not appear to be the case. The enormous majority of the entry answered, in the questionnaire, that London was the university of their first choice; amongst those who said Oxbridge was their preference, failure rates were actually a little lower, but the discrepancy between the independent and the grammar schools still remained.

It was not thought helpful to list the actual names of the schools from which these 470 students came. At University College there is no particular link with any one school as is often the case at Oxford and Cambridge colleges. It is extremely unusual to get more than three students from one school entering at the same time. The great majority come up as singles.

Sex differences

One might have suspected a difference in the sex distribution within the different school groups, and that this might partly account for the discrepancy of failure rates; this does not appear to be so, however. Table IV gives the academic categories and schooling for the sexes separately. Of the 470 A.A.H.S., of whom 128 (27 per cent) were women, almost equal proportions came from the grammar schools, 62 per cent of the men, 60 per cent of the women. There was a somewhat higher proportion of women in the direct grant schools, 20 per cent as against 12 per cent of the men (perhaps this is a reflection of a national pattern of schooling). There were left surprisingly similar proportions from the independent schools, 20 per cent of the women, 26 per cent of the men. Table V shows the different academic categories obtained by the men and women from

TABLE IV. SEX: SCHOOLING

	Grammar	Direct grant	Independent
Male	249 (62%)	30 (12%)	63 (26%)
Female	76 (60%)	26 (20%)	26 (20%)

the different school groups, and it demonstrates their remarkably similar academic results. For the independent schools the failure rate for both sexes was identical, 27 per cent; for the grammar schools it was 12 per cent and 9 per cent for men and women respectively. The other end of the scale, the academic cream, also failed to show any great sex difference. From the grammar schools there were 33 per cent of the men and 30 per cent of the women; for the independent schools 17 per cent and 15 per cent. The direct grant schools again occupy an intermediate position.

TABLE V. SEX, SCHOOLING AND ACADEMIC CATEGORY (A.A.H.S.)

Academic category	Sex	Grammar	Direct grant	Independent
Academic cream	Male	33%	23%	17%
	Female	30%	19%	15%
Academic average	Male	33%	40%	38%
	Female	42%	50%	54%
Academically poor	Male	22%	23%	17%
	Female	19%	24%	4%
Failures	Male	12%	13%	27%
	Female	9%	7%	27%

There are certain interesting differences between the academic performance of men and women in general, but as these are apparently unrelated to schooling, detailed consideration can be left to a later paper. Here we need only conclude that we have no evidence to indicate that sex differences are playing any part in the failure rate discrepancy, and there would appear to be nothing to suggest that in the data which follow in this paper the sexes should be presented separately.

Faculty

It is necessary to ask whether students from the independent schools are tending to enrol in faculties with stiffer pass standards and, if so, whether this could be a cause of the failure rate discrepancy. Table VI shows the proportions from the different schools in each faculty, and compares the failure rates for independent schools with those of the grammar or direct grant schools combined.

It will be seen that, whereas there certainly are considerable differences in the proportions from independent schools in each faculty, ranging from 10 per cent for Arts to 32 per cent for Engineering, they have a consistently higher failure rate in all faculties. Whilst it would be interesting to speculate upon the various possibilities that might underlie these different enrolment proportions, there is nothing to suggest any great relevance to our immediate enquiry; the discrepant failure rate does not appear to be much influenced by choice of subject.

TABLE VI. SCHOOLING, FACULTY AND FAILURE RATES

Faculty	Total Enrolment	Percentage from Independent School	Failure Rate Independent School	Failure Rate Others
Arts	119	10%	15%	7%
Economics	39	13%	40%	12%
Science	170	17%	27%	11%
Laws	73	31%	26%	12%
Engineering	59	32%	31%	17%

Father's occupation

A classification of father's occupation, really useful for a study of university students, is not easily devised, and to get wholly unambiguous descriptions, something better than 'Engineer', 'Civil Servant', etc., from the student by questionnaire is almost impossible. Kelsall's classification[2] will, in future, be used, but it was not available when this study was begun. In practice the student was simply asked 'Father's occupation', and his answer, where possible, was according to one of several categories. Those that were not really assessible, or in which the student had simply replied 'retired' or 'dead', were left unclassified. It will be seen that there is a great deal of guesswork in such an assessment; nevertheless, it is better than nothing:

Group I. Professional: teachers, businessmen, senior Civil Servants, etc.

Group II. Clerical: small business proprietors, shopkeepers, managers, etc.

Group III. Travelling salesmen, skilled and unskilled workers, storemen, etc.

Table VII shows the proportions from each group coming from the three different types of school. As would be expected, it demonstrates that comparatively small numbers of groups II and III sent their children to independent schools; many of those who did must have been helped with scholarships, but there is no direct evidence on this available here. A surprisingly large proportion of the group I students (53 per cent) were at grammar school. Schooling, though it reflected social class, does not appear a simple class cleavage.

TABLE VII. SCHOOLING AND FATHER'S OCCUPATION

	Grammar	Direct Grammar	Independent
Group I (N = 151)	80 (53%)	22 (15%)	49 (32%)
Group II (N = 94)	73 (77%)	10 (11%)	11 (12%)
Group III (N = 129)	111 (86%)	8 (6%)	10 (8%)
Unclassified (N = 96)	61 (63%)	16 (17%)	19 (20%)

To get an idea whether the discrepant failure rate is really more a product of parental social class and occupation than of schooling as such, it is necessary separately to analyse the academic results of each social group from each type of school. In the case of the independent and direct grant schools, the numbers from groups II and III are small, and it is best to combine them.

Table VIII gives the academic categories for each social group and school type separately.

The two striking findings are that social group appeared to have very little influence on the failure rate and academic performance of grammar school students generally, and that for the independent schools the failures have fallen principally in the top social group, where over a third came down. It seems to have been a disadvantage to be of the top social group only if one was privately educated; it seems to have been a disadvantage to have been privately educated

TABLE VIII. SCHOOLING, FATHER'S OCCUPATION, AND ACADEMIC RESULTS

Schooling	Father's occupation (No. in brackets)	Academic cream	Academic average	Academic poor	Academic failure
Grammar (N=264)	Group I (80)	31%	34%	23%	12%
	Group II (73)	24%	37%	24%	15%
	Group III (111)	36%	39%	17%	8%
Direct grant (N=40)	Group I (22)	5%	59%	27%	9%
	Group II / Group III (18)	23%	38%	16%	23%
Independent (N=70)	Group I (49)	18%	31%	16%	35%
	Group II / Group III (21)	10%	60%	20%	10%

only if one was of the top social group. This is perhaps a surprising finding, and it will be most interesting to see if the major follow-up study of the 1956 applicants for entry to British universities,[2] currently being undertaken at the London School of Economics, shows this to be generally true. If it does, it will pose an interesting social question. As the author has already indicated,[3] he believes that the answer may well be found in the proposition that overt and covert social and family pressures to go to university and to succeed, are often not a help but a burden and a hindrance. One might then expect that: (i) these pressures are most to be found in the children of the upper social groups who have themselves been to university; (ii) a family that insists on paying fees to educate its children privately, is more likely to foster such pressures than is one that allows its children to go to the 'ordinary grammar school'; (iii) the atmosphere and standards of the fee-paying school itself, often with a high proportion getting university places, is more likely to add pressure than is a grammar school where university entrance is the exception rather than the rule. The suggestion that such pressures are relevant is lent colour by some of the data that follow, and by some already published.[4]

Family and social pressures

The questionnaire asked a number of questions designed to throw light on these background pressures. Students were asked to tick certain multiple choice sentences as being most appropriate to their

case. They were asked to indicate what they felt was their parents' attitude to their going up to university: keen, fairly neutral, or against. Table IX shows the replies for successful and unsuccessful students from the different school backgrounds. Students were also asked about their own feelings at the time of going up; were they keen or were they uncertain? Their replies are given in table X.

TABLE IX. PARENTS' ATTITUDE, SCHOOLING AND SUCCESS

	Parents keen		Parents neutral*	
	Total	Failing	Total	Failing
Grammar (N=273)	173	14 (8%)	100	9 (9%)
Direct grant (N=42)	24	2 (8%)	18	3 (16%)
Independent (N=72)	53	15 (30%)	19	3 (15%)

* Includes 6 whose parents were "against".

Taken together these tables present an interesting picture. Keenness on the part of the parents (at any rate, as seen through students' eyes) was a little more common among the independent school group, 74 per cent as against 64 per cent from the grammar schools. Uncertainty on the part of the student was a little more common in the independent school group, 34 per cent as against 20 per cent from the grammar schools. The failure rate of the grammar school group is the same whether the parents were reported keen or not.

TABLE X. STUDENT'S ATTITUDE, SCHOOLING, AND SUCCESS.

	Students keen		Students uncertain	
	Total	Failing	Total	Failing
Grammar (N=282)	227	14 (6%)	55	9 (16%)
Direct grant (N=45)	35	3 (8%)	10	2 (20%)
Independent (N=71)	47	8 (17%)	24	10 (41%)

But in the independent school group substantially more of those whose parents were keen rather than neutral failed, 30 per cent as opposed to 15 per cent. Uncertainty on the part of the student was more commonly reported by all students who failed, but those from independent schools who failed reported it more often than did those from the grammar schools, 41 per cent as against 16 per cent. Taken together there emerges the suggestion of a picture of parental keenness in the face of student doubt comparatively more common among those from the independent schools. (It may well be that to report such a situation is but a post facto justification for failure—it is still noteworthy that it was reported by those from independent schools.)

Of the 24 independent school students who failed, 18 had returned questionnaires. Fully 16 of these reported that their parents were keen on their going up; 10 of these reported that they themselves had been uncertain. Of this 10, the father's occupation was given as professional by 7, and as teacher by 1; the remaining 2 were unclassified. Among the 36 of the grammar school group who failed 22 had returned questionnaires: 14 of these reported that their parents were keen, but only 4 reported that they themselves had been uncertain. Of the 14, the father's occupation was given as professional by only 2.

Students were also asked what they thought was their parents' attitude to their proposed choice of eventual career: keen, neutral or rather against. Table XI shows their answers. It is interesting to note how very much more often, in all school groups, the parents were thought to be more or less neutral. In all school groups less than 20 per cent thought their parents actually keen on their chosen

TABLE XI. PARENTS' ATTITUDE TO CAREER, SCHOOLING, AND SUCCESS

	Parents keen		Parents neutral		Parents against	
	Total	Failing	Total	Failing	Total	Failing
Grammar (N=271)	37	3	231	20	3	Nil
Direct grant (N=43)	6	Nil	35	5	2	Nil
Independent (N=71)	14	6	53	12	4	Nil

career. With so few parents being 'keen' the proportions failing can hardly be presented as percentages. It is, nevertheless, interesting to note that of the 14 from the independent school group who thought their parents keen, 6 failed to graduate; 9 students thought their parents against their choice: they all passed.

Students were also asked about their family background: was it such that it was always assumed that the child would go to university, or had only a few people from the family and their social circle been to university? The replies are given in table XII. It is an interesting comment on the times that from all school groups a majority reported that only a few of their family had been to university, 80 per cent from the grammar schools group, and fully 60 per cent from the independent school group. As in the previous instances, the high failure rate (37 per cent) is to be found only in the independent school group where the family background had assumed university.

TABLE XII. FAMILY BACKGROUND, SCHOOLING, AND SUCCESS

	University assumed		Few at university	
	Total	Failing	Total	Failing
Grammar (N=272)	57	5 (9%)	215	15 (7%)
Direct grant (N=42)	18	1 (5%)	24	3 (12%)
Independent (N=68)	27	10 (37%)	41	6 (15%)

Students were also asked whether many or few of their schoolfriends had gone to university. The replies, set out in table XIII follow the same general pattern. From all schools the majority report that many of their friends went to university, 73 per cent from the grammar schools, 75 per cent from the independent schools. Higher failure rates are found in both categories of the independent school group, but here again those where most friends went up have the highest rate, 26 per cent as against 17 per cent.

It is not felt that any of the findings presented should be regarded as showing the 'cause' of the independent school group's high failure rate. As has been said, the figures are not of a kind that would bear

TABLE XIII. FRIENDS GOING TO UNIVERSITY, SCHOOLING, AND SUCCESS

	Many friends went		Few friends went	
	Total	Failing	Total	Failing
Grammar (N=279)	203	17 (8%)	76	5 (7%)
Direct grant (N=46)	32	3 (9%)	14	2 (14%)
Independent (N=71)	53	14 (26%)	18	3 (17%)

statistically significant extrapolation. They suggest only a configuration of circumstances that surrounded this particular entry to university. Nevertheless, it is an interesting configuration, one that seems to bear out the suggestions about the harmful effects of social and family pressure. It is also a picture of firm enough outline to justify further research.

Personality factors

It is notoriously difficult to make adequate measures of personality factors by retrospective questioning. The questionnaire includes questions about psychosomatic symptoms, both in childhood and university, and questions about shyness and sociability. Subjects were asked whether they became engaged or married, or whether they had a particular 'boy friend' or 'girl friend' whilst a student. None of these questions showed any variation with schooling. There were, however, certain questions about composure at examinations, and there were, too, the clinical notes of the Student Health Centre on which were the records of many cases of pre-examination strain.[5] These two sources permitted drawing up a list of 'examination reactors'; 87 students who were disturbed before or during exams. Table XIV shows their schooling and the number failing to graduate.

It is of some interest that, whereas the grammar and direct grant school groups contained 21 per cent and 20 per cent of examination reactors, the independent school group contained only 8 per cent. The Final Examination is known to be the one that produces most clinical cases, a higher proportion of the independent school entry have already withdrawn by this time. Though the figures are small,

it does not seem that this can be the whole reason for the difference. An analysis of all the case cards of the entry was made and all those with psychiatric disorder of any kind treated at college were noted. (For discussion of implications and diagnostic terms see[6].)

TABLE XIV. EXAMINATION REACTORS, SCHOOL, AND FAILURE

	Exam reactors	% of entry	Number failing
Grammar	69	21%	8
Direct grant	11	20%	0
Independent	7	8%	3

This list of 113 students is analysed by schooling in table XV. This shows 25 per cent and 34 per cent of the grammar and direct grant entries, but only 15 per cent of the independent school entry had availed themselves of treatment for psychiatric distress. Early leaving for failure does not seem to be a factor here in that the proportions remain similar when only successful students are considered.

TABLE XV. PSYCHIATRIC DISORDER TREATED, SCHOOLING, AND SUCCESS

	All students	Successful students only
Grammar	81 (25%)	68 (24%)
Direct grant	19 (34%)	17 (34%)
Independent	13 (15%)	8 (12%)

It is not easy to suggest an explanation for these differences. It is to be remembered that, for table XV anyway, the figures represent students coming of their own volition for treatment; this may or may not represent a real difference in psychiatric distress, but in the attitude toward seeking help. In any event, the differences are interesting; further research would be needed to say more.

Direct grant schools

In many tables the direct grant schools have occupied an intermediate place between the grammar and the independent schools. It is difficult to be confident of an explanation for this, but it may well

be that these schools make by no means a homogeneous group. Some are more like the traditional fee-paying 'public school'; some are very similar, in atmosphere and approach, to the grammar schools. It may well be that the group of 56 students we have considered in this study is actually composed of a quasi-independent school group and a quasi-grammar school group. If one had known with any confidence which was which, one might have allocated the students and dispensed with the separate group altogether. In future research, for the sake of clarity and simplicity, it might well be worth attempting this.

Further questions

All the questionnaire items were analysed against schooling, but none seemed to suggest any consistent points of interest. Many of the topics—vacation work, hours of study, Union activity and the like—will be dealt with separately in later papers; here it is only necessary to say that school background did not appear to play a relevant part. But in saying this, it is necessary to re-emphasize the very grave limitations inevitable in retrospective questionnaire studies of this kind, especially when the number of subjects is small. Investigations such as this cannot offer conclusions; they can only point directions where further prospective research, by personal interview as well as by questionnaire, may prove fruitful.

For a more conclusive answer to this question of different failure rates, it would seem we should search in several directions. First we should confirm or disprove on a larger series, and with a better classification, the apparent relationship between parental occupation and schooling with failure. The matter of the apparent small number of students from independent schools in the 'poor student' group, if confirmed, would merit closer study. One would like to know more about what has gone on in the selection process; is being a 'good interviewee' a quality nurtured more in fee-paying schools, and how much influence has it? Are the different proportions in different faculties a regular feature, and do they represent a selection artefact or are there different proportions in the applicants? Finally, the whole question of the influence of these overt pressures from family and society needs further consideration. Here particularly, the effect on the student personally, or his own responses and attitudes should be most illuminating though it is an effect which

can only be fully discerned by personal interview of a psychological kind.

NOTES

[1] Malleson, N., Hopkins, J., 'University Student, 1953, I: Profile', *Universities Quarterly*, 1959, vol. 13, no. 3.
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DENT

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PHOENIX

HEALTH, FAMILY AND TEACHING

MILDRED COLLINS
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ONE would expect students entering a university education department to come from varied social backgrounds and to be, by virtue of their medical examination, reasonably fit. Actually not all students are physically A.1, nor as children have they been medically uninteresting. And, as everyone knows, some social classes graduate towards certain universities and certain professions. Several investigators[1] have reported on the relation between degree results and the health and family background of undergraduates but none, so far as I know, on the relation between these factors and the teaching ability of students after graduation. This account provides some evidence on this question and is based on part of a much wider enquiry[2] covering six sessions, carried out in one education department. It was assumed, when the investigation began nine years ago, that teaching ability was influenced by many factors; therefore, in order to make this part of the enquiry more manageable, a group of 84 poorer student teachers (all those students with teaching grades of C – or below) were matched with 84 of the better student teachers (with teaching grades of C or above) for degree standards, teaching subject, type of practice school, age, sex and university session. In this way a so-called 'poor' and a so-called 'good' group were isolated, and the teaching difference between them could not be explained in terms of better qualifications, easier schools, or more maturity of experience.

Quite recently in a follow-up study[1a] of a group of failed and a group of successful London undergraduates, it appeared that the former had had, not only more illnesses as adults, but also as children. The link between illness in childhood and some degree of adult failure, when not dependent on continued ill-health, may perhaps be looked for in the association between childhood illnesses and neuroticism which was found in the American researches based on records of soldiers in the last war.[3] This raises the question whether any relation between ill-health and poor teaching may not be

explicable partly in terms of mental attitudes associated with the former. Psychological characteristics, affecting as they do personal relationships, are likely to be important in teaching.

Psychological illnesses, especially of the severe kind, were found[1b] among Leeds undergraduates to be frequently related to disturbed features in the family history and family environment, such as divorce, suicide, etc.; but there are other family stresses of a less extreme kind described in *The Uses of Literacy* and *Look Back in Anger* which are likely to be known to 'normal' students. The 'teaching situation'—to use a current cliché—has echoes of the family group, with an adult having authority over, and having responsibility for, a group of competitive and dependent younger individuals. This means that there is the possibility that experiences associated with family life, such as isolation owing to illness or social class, or confidence nourished from continued parental support and affection, or displacement by younger brothers or sisters, may be 'touched off' by a return to school to teach. We shall therefore discuss the possible influences of health and home, bearing in mind that there may be a hidden connection between these two.

Health

(a) *Physical health*

To take the question of health first; the measure of physical fitness—or lack of it—was the record of the medical examination, on entrance to the department, of students of the 'poor' and 'good' groups, supplemented in 60 per cent of the cases by interviews. The interviews took place in the last 3 sessions only (the enquiry covered 6 sessions) and a further discrepancy in the completeness of the information followed from changes in the medical record

TABLE I. PHYSICAL CONDITION AND TEACHING ABILITY OF STUDENTS

Teaching ability	Childhood illnesses	Adult illnesses	Physical peculiarities	Visual defects	Physically* fit students	Total number of students
Poor ..	32	24	16	15	26	81
Good ..	26	19	2	17	43	83

* Some students had more than one physical 'weakness'.

itself during the 6 sessions. Nevertheless the two groups were matched session by session and a comparison can be made between the health of the two groups, although no value can be placed on the total number of illnesses recorded. The medical records not only included statements about the students' health at the examination but also information about certain childhood and family illnesses; the interviews provided further information about the last two.

Under these conditions of identification only 26 out of the 81 poor students had no records of either childhood or adult illness or physical abnormality, whereas 43 of the 83 good student teachers had completely clear records (information was not available for 4 students). This difference is not likely to be due to chance ($P = <.02$). Lack of a clean bill of health tended to be associated, not unnaturally, with poorer teaching; teaching can be a physically exhausting occupation. 'Ordinary' children's illnesses such as measles and chicken-pox were not included in the record, but the poor students had had more attacks of pneumonia, scarlet fever, diphtheria, and had had about twice as many operations, either as children or adults, as the good students.

TABLE II. CERTAIN ILLNESSES AND TEACHING ABILITY

Teaching ability	Skin diseases	Asthma	Hay fever	Tonsil operations	Other operations
Poor ..	1	1	2	8	13
Good ..	3	4	4	4	6

There was however one curious anomaly among the predominance of various illnesses and physical weaknesses within the poor group: table II shows that there were more cases of asthma, hay fever and skin diseases among the 'good' student teachers. Asthma, hay fever and some skin diseases are thought to be related in some way; they are all allergic diseases. Naturally there were relatively few students with these complaints (although as far as one can judge the proportion of asthmatics was virtually the same as that given for the student population as a whole), and in any case information about hay fever was not required until relatively recently: it may well be, therefore, that the difference in distribution noted here was a chance

one, but its presence against the general trend of other physical illnesses suggests otherwise.

The question arises as to why these particular illnesses might be associated with better teaching (academic achievement and school conditions being the same) whereas non-allergic illnesses of the kind considered in this enquiry tended not to be. Perhaps the answer lies in the conclusion of Stokes and Beerman[4] that asthma is associated with cyclothymic personality trends, with extroversion, sociability, toughness and energetic objective responses. These are characteristics likely to make teaching attractive to an asthmatic in spite of the disability of his disease. A similar relationship may exist in connection with the allergic diseases thought to be related to asthma.

(b) *Physical health and mental attitudes*

This possible connection between illness, personality and teaching supports the suggestion previously put forward that illnesses and abnormalities found more frequently among poor students may be connected with lack of teaching ability largely indirectly through personality trends. Prolonged ill health or an acute but severe illness, or some slight physical peculiarity, may encourage withdrawal from social groups and any tendency towards introversion, while parental over-concern, which not unnaturally develops about children who are ill, may accentuate tendencies towards passivity and timidity. Withdrawal, passivity and timidity are obviously not helpful in teaching. That there are psychological implications of childhood illnesses for students as well as for American soldiers is indicated by the records of students who attended the Psychological Service[5] during training: 31 students from the poor and good groups attended and of these 55 per cent claimed to have had serious childhood illnesses, whereas of those members of the groups who did not attend only 27 per cent made similar claims. Psychological difficulties, as measured by attendance at the Service, were significantly associated with poorer health up to the age of 13 years ($P = < \cdot 01$).

The importance of the psychological aspect of physical weakness is also illustrated by comparing the figures for physical peculiarities and those for ordinary visual defects as shown in table.[1a] Among the former were eye abnormalities which were still obvious, obesity, crippled limbs: among the visual defects were cases of myopia,

astigmatism, etc., all of which had been corrected by wearing glasses. In other words, while the 'defects' had been dealt with in a way common and acceptable in student society, the 'peculiarities' were weaknesses which were apparent and likely to influence social responses. The very slight physical disablement accompanying them seems insufficient to account for their statistically significant predominance among the poorer students (P almost ·001).

(c) *Psychological Health*

Thinking further along similar lines one might come to the conclusion that actual psychological illness would be likely to be more disabling in teaching than physical illness. Among the poor student teachers 2 had had nervous breakdowns during childhood, 6 had had nervous illnesses sufficiently severe to cause a break from study before entering the Department and one student was ill in this way during the course. Among the good students, however, 3 had had to break their degree course because of 'nervous illnesses' and a fourth was away for the same reason during her teacher training. Although this is a higher rate for psychological illness than that given by Malleson[6] for the 1950 U.C.L. intake of undergraduates the numbers are still small. The 'pattern' moreover is similar to, and certainly no worse than, that for operation; about twice as many nervous illnesses had occurred among the poorer student teachers, but they were not absent from the better teachers either.

A similar picture emerges when one turns to records of attendance at the Psychological Service. Although 24 out of the poor students attended compared with only 7 from the good group, one has to remember that 15 of the 24 poor students had been advised to go in the first place because of teaching difficulties; there was no such spur to attendance for the good students. Nevertheless the figures for both physical and mental ill health confirms one's expectations that the less fit the student is, or has been, the less adequate his teaching will be—other things being equal. However, it is reassuring to see, among the quite satisfactory student teachers, a few who had had 'nervous breakdowns'; this agrees with the findings for London undergraduates that there can be a 'good outlook for the treated cases'. It probably all depends on the case! An analysis of the small number of cases available suggests that prognosis is poor for teaching when there is a family history of neuroticism (all 5 of these were among the poor students) and when there is a lack of physical and

intellectual vigour without apparent psychological blockage (4 cases of 'inadequate personalities').

Family Background

(a) *Family Difficulties*

The importance of family background and experiences has been touched upon in discussing illnesses; we will now turn to consider it in more detail. During the last 3 sessions 49 'pairs' of students from the original poor and good groups were interviewed, as has been already mentioned, and of these 31 poor students and 19 good students had, or had had, family difficulties of the type indicated in table III. Some students had had more than one problem, but in the analysis only one was counted, those furthest to the left in the table taking priority over the rest.

TABLE III. FAMILY PROBLEMS AND TEACHING ABILITY OF STUDENTS

Teaching	Death of one or both parents	Long illness (not students)	Separation from parents	Strained relations	Financial difficulties	No problems
Poor ..	12	7	4	6	2	18
Good ..	10	3	3	2	1	30

The difference between the two groups is a significant one ($P = <.05$); students with more teaching problems tended to have more family problems. We have already shown that they had more problems of personal health too, so they might well be described as problem prone! Some of them had battled through extremely difficult circumstances with much courage.

(b) *Social Class*

Movement from one class to another or pressure to remain within one's class might present problems as well. The London enquiry[1a] showed that there was a tendency there for the students from the 'top business and professional groups to do less well': but inspection of table IV shows that among the groups in this enquiry students from this class formed a negligible proportion of the whole; a much

lower proportion incidentally than that found among undergraduates in universities generally[7].

Most of the families of the students in the poor and good groups came from classes 2 and 3, 82 per cent and 89 per cent respectively, so that members of classes 1, 4 and 5 might be described as 'outsiders', and it may not be just a chance occurrence that there

TABLE IV. SOCIAL CLASS AND TEACHING ABILITY OF STUDENTS
(Registrar General's Classification, 1951 Census)

Teaching ability	Social class of students' fathers					Unknown	Number of students
	1	2	3	4	5		
Poor ..	8	27	38	4	2	5	84
Good..	6	30	40	2	1	5	84

were slightly more of these students in the poor group. But the numbers are very small and there are certainly no statistically significant social class differences between the two groups, possibly because of the class solidarity of social class 3, to which almost 50 per cent of the students belonged. This class contains some white collar workers and when these are excluded and the children of manual workers only considered, then these together with those from classes 4 and 5, make up 36 per cent of the students; this relatively high proportion is in line with the findings of the Vice-Chancellors' inquiry[7] among undergraduates, in which 'sons of manual workers specified teaching as a proposed career more frequently than did sons with a white collar background'. But in this enquiry social class background seemed immaterial to teaching ability.

(c) *Birth order*

Social strain, or a sense of not belonging, may of course be felt not only between social classes but within the family itself, particularly at certain times. There is some evidence, historical and psychological, that there are elder and younger personality types; the Cains and the Abels, the dutiful and the prodigal sons. MacFarlane,[8] and his co-workers found significant differences between the problems of first born and non-first born children, the

former have more withdrawing and internalizing patterns and the second born are more overt and competitively aggressive. Different positions within the family seem to produce certain typical and different ways of responding to similar situations.

TABLE V. BIRTH ORDER AND TEACHING ABILITY OF STUDENTS

Teaching Ability	Elder or Eldest	Middle	Younger or Youngest	Only Child	Total Number
Poor ..	27	11	14	23	75
Good ..	16	7	22	30	75

(Information for 9 'pairs' of students was incomplete.)

A teacher and class are—as we have already said—something like a family group and table V shows that there were differences in the response to teaching of those students with younger brothers or sisters and of those without. There was a significantly higher proportion, 57 per cent compared with 31 per cent, of elder, eldest or middle children among the poor students (P about ·02). There was also a similar preponderance of such children among those students from the two groups who, while qualified to do so, chose not to take up teaching on completion of their course: information was available for 12 of these students and among them no less than 9 belonged to this sibling group. Apparently there is something about teaching which makes it less attractive to those who have younger brothers and sisters. This suggests that displacement or childish suspicion of displacement by a younger brother or sister influences a student's response to the younger persons he has to deal with in school. Morris[9] has said that a teacher 'reacts to children in part in terms of the child in himself', and there is evidence from the work of Thorpe[10] with school children that the first born find it more difficult to make easy personal relationships. Possibly something of this persists in adult life and helps to make teaching, at least at first, more of a strain than it would be to persons of social ease. It seems that this question of social ease may be the link between the diverse factors shown in this enquiry to be related to success or failure in teaching.

Conclusion

Within this one Education Department the records support some commonsense general expectations. Academic qualifications, type of teaching practice school, and age being the same, then those students who had always been physically fit, free from psychological and family problems, were the ones who on the whole began teaching satisfactorily. Small persistent physical abnormalities had an importance in teaching out of all proportion to the physical incapacities involved.

The results also support other research findings which unearthed rather unexpected relationships: students asking for, or accepting, psychological treatment claimed to have had more illnesses in childhood; social class background had no influence on achievement in teaching but some on the choice of profession. Finally there was the unexpected result that students with younger brothers and sisters appeared to find teaching less congenial or less easy than did those who were youngest or only children. It was suggested that this was due to behaviour patterns set up by experiences within the family. It was suggested also that the unexpected occurrence of more asthmatics among the better teachers—if more than a chance distribution—could be explained in terms of a personality pattern associated with asthma. Obviously all these results and conclusions, based as they are on only 160, or fewer, students, need to be checked against records of many more students in other education departments.

From the point of view of guidance within—or out of—teaching, it would be useful to be able to assess the potential influence of health and family background of a student. One's first reaction is to try to help a problem-ridden student from an insecure background into the relative security of the teaching profession. This may be a mistaken kindness—unless some very special help is given. From the evidence presented here and from that gleaned from a follow-up study of members of the two groups,[2] it seems important before coming to a decision to look closely at the kind and duration of problems involved, in the context of the intellectual and personal qualities of the student concerned, and the type of teaching envisaged. The hypothesis put forward here is that seemingly dissimilar problems may derive some, if not all, of their importance in teaching from their influence on a student's social behaviour. Awkwardness in social rapport is almost certain to be a disadvantage

in teaching, though one would guess that the extent of the disadvantage would vary with the type of school and subject.

NOTES

[1a] Hopkins, J., Malleson, N., and Sarnoff, I., 'Some Non-intellectual Correlates of Success and Failure among University Students'. *British J. of Ed. Psychology*, vol. XXVIII, part I, 1958.

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I should like to thank the students who so kindly co-operated in this enquiry.

SORTING STUDENTS MECHANICALLY?

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ALTHOUGH this article is to some extent a comment on the recent report on the 'Procedure for Admission of Students',[1] its main purpose is to illustrate that the selection by the country's universities of their students raises an issue in the theory of social choice.[2] In the many discussions on selection which I have heard or read this general point seems to be neglected and it is therefore perhaps worthwhile for an amateur in the field to raise it. I do so in the hope that those more expert will consider whether a systematic examination of the problems of university selection from this point of view might not be practically valuable. Given the limitations of the relevant information which can be made available by universities and by candidates for places at universities, any procedure for admission must fall short of an ideal which takes full account, subject to the distribution amongst university departments of available places, of the preferences of both universities and candidates. Some procedures, however, probably come closer to the ideal than others, and the growing demand for university education, the coming 'bulge' and the general importance of the satisfactory selection of university students are eloquent reasons for trying to determine, if this is so, which they are.

At first sight it seemed possible that the obviousness of the issue raised here was responsible for its explicit neglect. Experience, albeit limited, has convinced me that this is not so. Rarely, for example, does the suggestion that a clearing house operating on purely mechanical principles for applications for university places elicit the comment that would be expected if the issue were generally appreciated. Nor would it have been elicited from me before reflection. The illustration here is certainly extremely elementary. An abundance of logical elaboration is possible. Only those expert at such elaboration could answer the question whether it would have any further practical relevance to some of the basic problems inherent in the admission of students to universities.

The present predicament in the selection of students provides a starting point for the discussion and it can be conveniently illustrated

by this year's experience in my own (Economics) department at Southampton. The experience of other university departments obviously differs; economics and its related subjects are fairly uncommon at school and we are thus presented with difficulties which some departments do not share; as a small department we are frequently not candidates' first choice; other departments may deal with the predicament in different ways. Nevertheless the elements of our experience are common as the report of the Ad Hoc Committee bears witness.[3]

We had, at the beginning of August, about 150 candidates for a first degree course on a waiting list for about 40 places. The candidates had been told their selection largely depended on a 'satisfactory performance' at 'A' level; satisfactory both in itself and in competition with others on the list. On the receipt of the 'A' level results a considerable proportion of the candidates were rejected, the others were ranked—with some regard to their school reports and their showing at long-past and brief interviews—in the order in which the Department would have liked them. Offers of places were sent off to the top 40 or so candidates in the knowledge that some of those 40 preferred other universities but uncertain as to who they were or whether the other universities, with their differently composed group of candidates, would want them. A considerable number of replies were—with some delay and, as expected—refusals. We despatched an equal number of further definite offers to the candidates next in order on our ranked list. More refusals, more definite offers and so on, until the 40 or so places had been filled.

This departmental experience is sufficiently wearisome to raise the question of whether better arrangements cannot be contrived. The proposals of the Ad Hoc Committee, which will be implemented this year, are designed to introduce tidiness and uniformity. But can it not be argued that the proposals of the Committee, welcome as they are, do not squarely meet the predicament?

The predicament arises from the fact that it is in the self-interest of candidates to apply for a place to several universities. At a guess 3 or 4 is the commonest number in the experience of our Department, but 6 or 7 is not unknown. I believe candidates increasingly recognize this self-interest, awareness of which may to some extent have been heightened by the 'Kelsall Report':[4] a fact which, if true, is not to the report's discredit; on the contrary. About 8 per cent of apparently 'reasonably qualified' home applicants to universities (excluding

Aberdeen, Cambridge and Oxford) in October 1955 failed to secure entry either in that October or in October, 1956. This 8 per cent was made up of candidates who did not fulfil faculty or departmental requirements at the universities to which they had applied and who were not in that sense fully qualified in all respects, some who showed up poorly at the interviews they had had, some badly reported on by their referees and some who were offered a place but who for reasons of their own did not choose to take it up. The number of candidates in each of these categories will never be zero so it is reasonable to think of some percentage as representing a 'legitimate rate of disappointment'.[5] Whether 8 per cent is the appropriate rate is another and not immediately relevant matter. What is immediately relevant is that every candidate is likely to do his utmost to avoid his own inclusion in any but perhaps the last of the categories and multiple applications is one means of taking avoiding action.

Multiple applications are, to put the matter in another more usual way, a consequence of the demand for university education growing more rapidly than the number of university places, although it is true that even if total demand were not growing more rapidly than the total number of places, a problem, though a less severe one, of multiple applications would still result from the demand for places at a few highly desired universities (and university departments) outstripping the supply. They serve, in a rough and ready way, the admirable purpose of aiding the allocation of candidates to universities broadly as the candidates prefer having regard to the universities' assessment of them and the places available. Since the reasons for them and the purpose they serve are admirable, multiple applications can, up to a point, be encouraged even though they tend to make many university departments unable to sift unqualified candidates by interview or other methods as carefully as they otherwise might. The surmise is, I think, permissible that the Ad Hoc Committee had this kind of consideration in mind in making their proposals. Their proposals do not preclude future repetitions of our departmental experience this year. For example, making offers to unqualified candidates provisional on their attaining a certain stated standard in their 'A' level examination, even with the proviso—which we intend to use—that if the standard is unattained the application does not automatically fail, does not necessarily diminish the incentive of candidates to submit multiple applications. On the other hand, not to adopt the proviso would seem an encouragement to multiple applica-

tions, unless the standard is set so low as to reassure most candidates—in which case the risk of being committed to taking an undesirably large and/or poor average quality entry is high.

To mention to most university members a clearing house for applications is, in my experience, to obtain the reaction that universities would be wrong to allow the selection of their students to be taken out of their hands.[6] At first blush an economist finds this an odd reaction. Clearing houses are fairly common features of commercial life and they are not the sort of tail which normally wags its dog. Nevertheless the reaction has its practical justification. Selection is, I believe, done by the clearing house for applicants to training colleges. Perhaps the logical reason—to be outlined shortly—why a clearing house would have to resort to arbitrariness also lies behind the reaction. Still, strong feelings against the clearing house idea must avoid obscurantism. A partial application of the idea—a scheme which was tried out experimentally for the current session by the Engineering Faculties of the universities of the U.K. of a clearing house[7] to inform candidates, who have in September failed to gain admission to the universities of their choice(s), of unfilled places elsewhere—can be welcomed unreservedly by the most ardent upholder of the right of a university to select its students. This may be the best way of dealing with the 'deserving candidates' amongst Mr. Kelsall's 8 per cent when despite a general multiplicity of applications there are in September places unfilled in some university departments. Nor, in resisting the clearing house idea, should the extent of the choice which many university departments exercise in the selection of their students be sentimentalized. There is a departmental standard which successful candidates must attain; a persuasive word may secure the occasional 'good man' and so on; but in the context of multiple applications the department is often best regarded as taking part in a national process of selection where its views count, but so do, rightly, the views of the candidates and of other universities.

However that may be, I do not find that opposition on principle extends to a clearing house which merely (by mechanical aids, as an administrative necessity) sorts out candidates, subject to the distribution of places available, according to candidates' preferences for universities and universities' preferences for them. Could such a clearing house be organized? Universities would have to agree that candidates' applications—like rejections of applicants and acceptances of definite offers of a place—would have, as a clerical routine, to be

passed through the clearing house to ensure that the candidate was giving each university to which he was applying (four, say, in number) the same statement of the order in which he preferred them. In itself this would be a gain. Universities naturally have some preference for candidates who really want to come to them as distinct from other universities and they would know the statement of preferences was reliable in the sense that consistency had been imposed upon it. The present unreliability of the statements and the fact that candidates' preferences often (in what proportion of cases?) mean little—particularly when they are first thinking of applying for a university place—leads the Ad Hoc Committee to propose that statements of preferences be no longer required. But one would think a simple procedure to enable candidates to change the order of their preferences after they had been in touch with universities could easily be devised by the clearing house so that it was purely clerical routine to send on the new order to the universities concerned. This too would be useful information.

Could not, in late August or early September, each university submit to the clearing house a list of its candidates ranked in the order in which it would like them, appending rejected candidates and distinguishing of course the rankings of each of its individual departments or sub-departments and at the same time informing the clearing house of the number of places available in each department or sub-department? Admittedly such rankings invite objections. No-one can deny that arbitrary and invidious distinctions would enter into them. But, having regard to the fact that nothing would turn on the exact orderings of the top candidates within at least the number of departmental places available (and because of multiple applications beyond that number for many departments), would they do much more than make explicit an essential element in present (and any) practice? Some departmental heads would be loath to commit themselves to a ranking because their aim is a particular kind of balanced intake and their next choice, when one candidate refuses the offer of a place, depends at present to some extent on who the particular candidate is who has refused. There is no reason why some account could not be taken of this consideration. Still, in view of what follows, this point need not be argued in detail.

Could not the rank or refusal he has been assigned by each university department to which he has applied be punched onto each candidate's card, a card already filed away punched with the universi-

ties of application and the order in which the candidate prefers them? Could not a grand sorting then begin to allocate candidates to university departments taking account (mechanically) only of the information on candidates' preferences, university rankings and numbers of places available in each department? The prospect is alluring. The permanent staff of the clearing house could be quite small and at the end of August and the beginning of September there must be available Hollerith installations which could be hired for the necessary sorting. A doubt creeps into the mind as to how long the sorting would take; but its instant dismissal is possible since a logical snag renders the whole scheme unfeasible.

The snag is the reason why a clearing house scheme where discretion is allowed to the clearing house is, in a fundamental sense, easier to administer than a scheme where discretion is rigidly excluded. This does not mean of course that the problems of administering a clearing house invested with discretionary powers are inconsiderable. Far from it one may judge. Perhaps it is in place here to ask, in spite of the repugnance with which most of us would regard it, that if such a scheme has had detailed consideration, for the results to be published. It is not impossible that present procedures of selection will be subjected to such strains by 'the bulge' that only fairly widespread and soundly-based knowledge of the inadequacies of the available alternatives will prevent successful agitation for ill-considered expedients to meet the strain.

The snag emerges, not invariably in taking account of ordered preferences, but when, for example (as one feels would very often be the case) different universities rank candidates differently and contrary to the candidates' preferences. Consider the economics department of, say, Sotonia and Mancunia with two places to fill. Both departments have the same candidates, Bacon, Cowper, Newton and Owen. Bacon and Cowper prefer Mancunia to Sotonia; Newton and Owen have the contrary preference. The Sotonia economics department however, prefers Bacon and Cowper to Newton and Owen, whilst the Mancunia department prefers Newton and Owen to Bacon and Cowper. When, at the clearing house, all candidates' cards are sorted by the machines for the cards of candidates who have applied to Sotonia by department and when they have been ordered according to the ranking given to the candidate by the departments, the two cards at the top of the pile for the economics department are Bacon and Cowper. A member of the clearing house staff, after referring to

an indicator which tells her that two places remain to be filled in the economics department at Sotonia, takes the top two cards from the pile. She notes, however, that the preference of both candidates is for another university than Sotonia. Neither can therefore be selected; places may be available for them at the university they prefer. All 4 cards are replaced in the main file. When, later on, all candidates' cards are sorted for the cards of candidates who have applied to Mancunia the same 4 cards (unknown to the clearing house staff) turn up again in the pile for the economics department. This time, however, the top two cards are those of Newton and Owen. But it is noted that their first choice is not the university under examination. No move to fill the two vacancies is made. Clearly this could go on indefinitely.

Although irrelevant to its logic, the situation outlined in this example is perhaps most easily conceived as occurring at the clearing house in the middle or towards the end of the mechanical sorting. Departments at universities which Bacon, Cowper, Newton and Owen preferred to Mancunia and Sotonia have been filled. Mancunia and Sotonia are their first and second preferences (and vice versa) by their exclusion from preferred universities.

If the situation were brought to light it could easily be dealt with arbitrarily by rating university preferences superior to candidates' preferences, or candidates' preferences superior to university preferences, or better, perhaps, by a process of random allocation; better, because a random procedure would have applicability in all similar situations. Would the situation be brought to light? Obviously only if a series of mechanical operations with the machines were specifically designed to do so. In theory such a series is perhaps just conceivable, but the additional complexity would in practice be impossible to contemplate—if only because a limited time is available between the receipt of 'A' level results and the beginning of session. Nor if the hurdle could be got over, could its surmounting be enthusiastic. Random allocations may (occasionally) warm the hearts of statisticians; they will hardly move the hearts of academic registrars and university administrators to new endeavours.

Arbitrariness, it is important to realize, is not necessarily excluded by direct reference (*per impossibile*) to the universities and the candidates. They might not agree amongst themselves, and the toss of a coin might even then provide as good a solution as could in practice be hoped for.

What solution to this kind of situation is implied by the proposals of the Ad Hoc Committee? It is not the intention of the answer sketched below to be critical. If it appears so, remember the broad context; present practice modified by the proposals exemplifies the over-riding virtue of feasibility.

It need not be assumed in answering the question that the students apply to the same number of universities. Whilst the situation could not exist without multiple applications, it is dependent on the level of applications only in the sense that the more intense, as it were, their multiplicity the more likely perhaps the situation is to occur. Its occurrence is possible whatever the level of multiple applications. It is thus for convenience merely that the answer to the question takes the number of universities to which the four students apply under the Ad Hoc Committee's proposals to be the same. Since these proposals do not necessarily diminish multiple applications, this is not unreasonable.

Under the proposals Universities Mancunia and Sotonia would be ignorant of the preferences of the four candidates except (so far as they had been consistent and honest) as to their first choice (at the time of application). That most candidates, like Hamlet and most of us, are 'indifferent honest' can be inferred from the characters of those who become our students; on the same evidence some can be fairly doubted and, as candidates, who they are is impossible to determine. In mltigation, one must remember that many candidates feel their future lives in balance. The decorum convenient to administrators cannot invariably be expected of them. Certainly the candidates themselves would in late August and early September be waiting to hear from all the universities which had given them provisional aeceptance or put them on their waiting list.

As before the assumption is that Bacon, Cowper, Newton and Owen fail to attain the standards of their universities of first choice, but of course they may do well enough reasonably to hope to be offered a place under the 'reconsideration proviso' if the universities in question have adopted this proviso. Notification that these offers will not in fact be forthcoming may arrive earlier or later than notifications from other universities.

Other assumptions can be varied. First, let all four attain the stated standards of both Mancunia and Sotonia economics departments. Two definite offers will be forthcoming to each of them. Both university departments, each really wanting only two students, are tem-

porarily afraid that they are committed to exceeding this number. If the departments had ascertained the candidates' preferences—and were sure of their reliability—these fears might be negligible. Still all is well, except that the universities do not get the candidates they prefer, the candidates themselves may be in a (slight?) dilemma if they are waiting to hear from their universities of prior choice, and other candidates will be kept in suspense until the four cases are settled. Clerical labour and postage are not wasted. The resources (clerical and postal) used are the cost of ascertaining information under the system. This cost under any system though it can be greater or less can never be zero.

If as a second assumption the candidates attain the standards (the standards are not necessarily higher or lower, just different) of the university they least prefer they can be confident of a place but they will hope that the 'reconsideration proviso' will be operated in their favour by the university they prefer. Obviously they are inevitably (and blissfully?) ignorant that to turn down the offers they have will, whilst worsening the situation from the point of view of the universities, bring about the operation in their favour of the 'reconsideration proviso'. They are likely to wait till the last minute (keeping other candidates in suspense) to hear something they cannot hear.

If as a third assumption, all four candidates fail to attain the stated standards of both universities, Sotonia will (under the 'reconsideration proviso') send offers to Bacon and Cowper and Mancunia to Newton and Owen. Once again the candidates, acting sensibly on the maxim that 'a bird in the hand', cannot know that refusals will turn the situation in their favour (but against the universities). Generally speaking none of the above results is likely to be educationally calamitous. But they may differ from the result which would ensue if all participants could see the situation as a whole. The university departments might, in that case, vary their preferences for the sake of having students who preferred them.

However that may be, the general point these examples illustrate is, I hope, clear. The selection of university students depends on candidates' preferences and universities' preferences, which can in practice be expressed only by orderings. (If the intensities of the preferences could be measured and comparisons of the preferences of universities and candidates were possible, the present story would be different; but that is here of academic interest only.) These orderings may, and are even likely, not to be consistent with each other.

Consistency cannot be achieved by a rule or the operation of a mechanical process; the final result will depend on a process into which arbitrariness and chance enter. That these elements enter into the selection of university students few will deny. The realization is less general that they arise not altogether from imperfections of practice but from the nature of the case, the inconsistencies which exist amongst the relevant preferences, inconsistencies which in the present context of the (logically distinct) excess demand for places have become of greater practical significance. This does not mean nothing can be done to diminish such elements; the Ad Hoc Committee's proposals are designed to do that. On the contrary, it points to the necessity for a sense of experimental realism. If the job were straightforward it could be done by a machine.

NOTES

[1] Report of an Ad Hoc Committee on Procedure for Admission of Students. Committee of Vice-Chancellors and Principals of the Universities of the U.K., 1958.

In writing this article I have benefited from discussions with Professor W. E. Armstrong, Professor A. N. Black, Mr. S. I. Benn, Miss M. Price White (Academic Registrar of the University of Southampton) and Mr. W. Bone (Manager of the Southampton branch of the British Tabulating Company).

[2] This was suggested to me by Chapter VII of Kenneth Arrow's *Social Choice and Individual Values*. Wiley, New York, 1951.

[3] Op. cit. p. 2.

[4] Report on an Inquiry into Applications for Admission to Universities. R. K. Kelsall. Association of Universities of the British Commonwealth, 1957, p. 23.

[5] Report of Proceedings Home Universities Conference, 1957. Association of Universities of the British Commonwealth, pp. 63/4. The statements in the text are a paraphrase of Mr. Kelsall's contribution to the Conference.

[6] For a statement of this point of view see Sir James Mountford's contribution to the Home Universities Conference, 1957. Op. cit., p. 45.

[7] Operated by Professor H. Wright Baker of the Manchester College of Science and Technology in collaboration with Professors of Aeronautical, Civil, Electrical and Mechanical Engineering. 'Clearing House for Engineering Candidates', H. Wright Baker. *Technology*, December 1958. See Professor Wright Baker's comments that follow.

CLEARING HOUSE OR INTERVIEW?

H. WRIGHT BAKER

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THE Editor has invited me to add one or two comments on the subject of a clearing house for the universities.

The Clearing House for the Engineering Schools was successful because it came into operation only when a mechanical operation was reasonably justified. Hopes of finding special pegs or special holes had faded, and, with both sides still retaining their individual rights, information based on a nearly mechanical process was welcomed.

Much had already happened, however, at a non-mechanical level, and though increasingly efficient methods may be used in the future it must not be forgotten at any single stage that the process of recruitment is not the selection of things by punched cards, but the selection of people by people—and the selection of unusual people by unusual people at that.

The grading factor obtained by examination is well established, as are the factors based on the headmasters' reports of progress and personality, but no one would claim that they were completely reliable. Examinations are tricky things, and headmasters are not always without bias in dealing either with the choice of subjects for study or in their assessment of personal merit. Even when correctly graded the applicant is still a person, it is his future which is being considered and he must be given a full opportunity to make his contribution. If there are matters which raise doubts in his mind or which he has overlooked they should be discovered and discussed.

Even allowing for the valiant efforts of many schools to offer sound advice to their students, it seems essential that each applicant should be quite free to seek an interview with one or two university schools of his own choosing, as much for the purpose of obtaining advice as of being accepted or rejected. If one university interviewer is chosen in each department for the breadth of his experience in the subject of his school and for his sympathy and wisdom I do not think that he will generally find much difficulty in making a proper

selection also, but to confront a nervous youngster with a 'Board of Academic Assessors' may make it quite impossible to seek out the questions which are still too fluid to have been rehearsed in anticipation and one doubts whether the selection is any better. In informal discussion many problems come to light: the candidate's relations with home or school; individual preferences—sometimes very sound—which may conflict with those of parents or teachers who are not always reliable. An applicant who is in doubt about his grounds for selecting a course of university study may be advised to have a chat with the interviewer's colleagues in other schools and this may lead either to the transfer of his request for admission, or a firm decision to stick to his first idea. He may be advised to seek admission to some other university because it is nearer or further from home, or provide better facilities for a chosen line. A brief visit to laboratories may confirm—or debunk—the impression conveyed by a university prospectus.

All these things take some time and trouble, but it is a minute fraction of the time and trouble at stake. Surely here is a contribution which, within reasonable limits, the universities should be willing to provide and which will do much to ease their own burdens later. Universities are not popping pegs into their own holes, they are helping to develop full men and women. A mechanical device which cannot give advice or assess an opinion, or change its mode of operation as rapidly as an honest and immature young man can change his mind is ruled out. Even professors have been known to change their notions.

It seems a pity that applicants are now only asked to state whether the university to which they are applying is or is not their first choice. Many present perfectly valid reasons for two preferences, although usually they go no further, while in not a few cases it is fairly safe to assume that their first hope will not be justified and that time will consequently be lost through not stating the second. It is certainly not often that the trick is tried of giving first preference to each of several universities simultaneously, and most interviewers must have read enough detective stories to be able to expose it rapidly and very effectively under the trickster's nose. The only person to lose seriously is the man whose sin is perpetually being found out.

Even if a punched card may at last have become a legitimate tool I hope that it will not even then remain the only one in the

kit. The unfortunate ones are often much in need of even a very little extra advice, which can easily be offered in a friendly and informal way. It is surprising how many applicants to Clearing House had not realized that quite elementary conditions remained unsatisfied or that a higher level of marks would normally be expected from those who had failed at previous attempts.

I hope that no clearing house will ever be run on the assumption that applicants can be graded and distributed like eggs. Trouble begins when a man feels that he is being classified by a punched card, tragedy begins when he knows that he can be.

I have just been able to make an estimate of the values of school reports and university interviews, and a comparison of G.C.E. performances in mathematics and physics at advanced level with maths, physics and average sessional examination results at the end of the 1st university session of professional study. The number of students involved in the exercise is sufficient to give a reasonable measure of reliability to the deductions. The estimate covers one school of mechanical engineering.

Assessment of academic ability and personal qualities have been prepared, (a) as the result of interviews at the university by a senior and experienced member of staff, and (b) from headmaster's reports; in both cases the G.C.E. marks being still unknown.

1. It is interesting to note that though the intake to the department increased by 35 per cent over the previous year, the proportion of students obtaining an average of less than 40 per cent at the end of the 1st university year decreased, and the proportion obtaining an average of over 60 per cent increased in almost exactly the same proportion.

2. On both academic and personal matters the university assessor (U.A.) and the headmaster (H.M.) were in agreement in 70 per cent of the cases considered.

Headmasters were inclined to be optimistic about five times as frequently as the U.A., but agreement was reasonably close in another 17 per cent of the cases, and in only one normal case was the H.M. quite wildly (and unjustifiably) enthusiastic.

3. In general the average sessional mark appears to be about 12 per cent lower than both H.M. and U.A. seem to have expected, judging from school reports and interviews. The mathematics mark in the sessional examination was about 8 per cent less than the corresponding G.C.E. Advanced mark actually attained in that

subject, while the sessional marks in physics were in close agreement with the G.C.E. assessment. Those who failed within a reasonable distance of the pass mark usually showed a drop below their G.C.E. level of about 20 per cent in mathematics.

4. About 5 per cent of the intake failed very seriously at the end of the session—after due warning—apparently due to the fact that the men concerned had made no serious effort to work. These cases were unpredictable, as their classifications by H.M. and U.A. had varied from 'Excellent' to 'Poor'.

On the whole it would appear that a pass in G.C.E. advanced maths at a level of the order of 55 per cent is a reasonable requirement. The opinions of headmasters provide a sound but optimistic guide. The assessment of the university representative has in general been in close agreement with that of the headmasters and serves as a useful and very desirable check, usually—but not always—against undue optimism.

Of a greater significance, which is outside the scope of this exercise, appears to the writer to be the opportunity provided by the interview for a student to get individual advice concerning his future from an understanding and sympathetic authority in the school he wishes to enter.

THE GENERAL KNOWLEDGE OF STUDENTS

H. MADDOX

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THE results of a small study of the general knowledge of students at Birmingham University may be of interest. They are in many respects inadequate, and the only justification for presenting them here is the present lack of objective evidence on this subject.

A test of general knowledge was adapted from American sources, consisting of five sections: history and social studies, literature, fine arts, general science and mathematics. Each section contained 40 questions of the multiple-choice type.

In content, the test might be criticized for omitting current affairs and for including mathematics, and in form for testing piecemeal memorization rather than understanding. Nevertheless its empirical validity turned out to be satisfactory.

So far the test has been given, under examination conditions, to 63 arts and to 26 applied science students. The arts students were taken from several different departments, from first, second and third years, and included both men and women. The science students were all men second year students in one department. So far as is known the samples tested were reasonably representative.

Students were also asked to fill in a questionnaire about subjects studied at school and university, newspapers, journals and books read, membership of student societies, and avocational interests.

As might be expected, the low scores of the science students in literature are paralleled by the low scores of the arts students in mathematics. The best of the science students reach the average scores of the arts students in history and social studies and in fine arts. There was very little overlap between the two faculties in the other three sections.

The results suggest that a minority (but only quite a small minority) in science is ignorant of literature and fine arts, and that a minority in arts is similarly lacking in general science and, more particularly, in mathematics—being unable to solve simple arithmetical problems of the type: *A man pays £25 simple interest for*

the use of £2,500 for 4 months. What is the annual interest rate? (This item was failed by nearly 50 per cent of arts students.)

Only about a quarter of students are regular readers of *The Times* and *Guardian* (most science students say they have no time). The *Daily Telegraph* is the most popular choice, followed closely by the *Daily Mail* and *Daily Express*.

GENERAL INFORMATION TEST

Second Year Students		History & Social Studies	Literature	Fine Arts	Science	Maths	TOTALS
	Maximum	*40*	*40*	*40*	*40*	*40*	*200*
Arts	*Mean*	25	33	28	16	13	115
(no. 23)	*S.D.*	5	3	5	4	5	15
	Range	13-34	24-37	19-36	11-27	3-29	84-138
Applied	*Mean*	16	15	15	31	34	111
Science	*S.D.*	5	5	6	4	2	17
(no. 26)	*Range*	9-28	5-25	6-27	22-38	30-40	87-146

Among journals and magazines *Punch* and *Readers' Digest* predominate, indicating an almost exclusive taste for humour and potted information. Some scientists have rather more low-brow tastes, descending to *Illustrated* and *Reveille*, but even among the arts sample only about one-third read high-brow weeklies such as the *Spectator* and *New Statesman*. About the same proportion of scientists, it should be said, regularly read their professional and technical journals.

Students were asked to list the books outside their field of study which they had read in the last three months. Popular modern novels predominated. About one-third of the science sample listed no books at all. Among the others, paperbacks, especially war stories, and the novels of Greene and Shute were the popular choice, but a minority of science students do read biographies, the classics of literature, and even poetry. The arts students also read mostly modern novels, but also Dickens, Hardy and V. Woolf, a great deal of modern poetry, and popular books on religion (which no science students listed). Arts students rarely go beyond the peripheral boundaries of their subject, except in one department which had

arranged some courses in science as an experiment in broader education. A few of these students had evidently been stimulated to read books in biology and social affairs.

Taking total score on the test as an admittedly crude index of general knowledge, there is a relationship between type of residence and general knowledge:

		Mean Total Score	*Standard Error*
Residence in Hall (men)	(7)	132	±3
„ „ Home	(17)	117	±4
„ „ Lodgings	(59)	109	±2

The samples involved are too small for much confidence to be placed in these figures, but they seem to underline the cultural poverty of life in lodgings.

The only other factors associated with a high test score were wide reading, diversity of avocational interests, and social class.

These findings leave plenty of scope for individual bias in interpretation. Possibly disturbing features are the almost complete absence of reading on social and political topics, and the exclusively literary interests of many arts students.

In both faculties the high scorers tended to read in fields peripheral to their own rather than in widely separated fields: the better informed science students reading professional and technical journals, and the better informed arts students reading modern history, drama, etc. This might be regarded as supporting the thesis that, at any rate under the present system of three year honours courses, broader education should proceed from the subject of specialization to closely related fields.

CORRESPONDENCE

UNIVERSITY STANDARDS

SIR,

Anyone who attempts to do some re-thinking about a university institution must expect to be attacked. Unfortunately, Mr. Phillips's reply to my article on University Standards* advances us no further, as he confines himself to his own opinion and produces no supporting evidence nor does he contribute any new ideas. This is a problem which can be solved only by the evidence of research.

Mr. Phillips concludes, 'I feel very strongly that the various discrepancies which his statistics reveal are the combined result of many factors which he does not consider.' In fact I repeatedly state that other factors are involved, e.g. 'The operation of other forces, such as an unusually selective entry to a department . . . may blur this pattern,' and, 'The factor outlined is not, of course, the *only* force at work.' Mr. Phillips merely rejects my theory without bringing any evidence to support his rejection, and I still maintain that 'the principal reason why a much larger proportion of Firsts are awarded in mathematical type subjects than in "essay type" subjects may well lie in the nature of the material, which produces a greater range of marks'. Finally, when Mr. Phillips confuses 'the degree standard' with the standard of attainment of the students (p. 284) and later writes 'I am certain that the three Thirds just mentioned would have had the same classification with *any* examining board', he merely shows an ignorance of the science of examining.

Time after time university examiners, confronted with the results of carefully controlled research into examining, have taken the same standpoint as Mr. Phillips. But time after time, when their own examining has been subjected to an investigation, they have, to their astonishment, been found wanting. Yet still many refuse to believe, due to a self-defence mechanism, and also to a confusion of meanings. Examining is a word with a multitude of aspects. One of these, the ability to place students in a fairly reliable order of merit, is the one which comes immediately to the mind of the university examiner, and from this comes an extension, that he is

* See this Journal, February and May, 1959.

able to place them in classes with a high degree of reliability. Now, for Honours examining there is some truth behind the first point because *within any one department* in any one year this can be done fairly well, by reason of the number of papers and number of markers. It follows that examiners are able to place the students in classes with similar reliability, provided that they do not have to relate these classes to a vague outside standard. It is when one endeavours to obtain comparison with departments of the same subject in other universities and also with departments of other subjects that many doubts arise. Even within a department an appreciable alteration of standards may take place if there is a change of influential personnel.[1] These doubts were supported by statistics in the previous article.

With first-year examinations there are additional doubts. In first-year examinations the candidate no longer has the protection of the variety of papers and markers and the situation is at its worst when there is only one paper. Fluctuations in the standard of the paper (especially in mathematical subjects) or in the standard of marking (especially in essay type subjects) are most difficult to avoid. Research shows us that even the order of merit in the essay type subjects will be far less reliable than we would wish.[2] Nor are there external examiners to attempt to maintain a common standard between universities.

Some evidence on these points was presented in the previous article. Here are two further *opinions* by researchers who are working in the related field of student selection. Malleson[3] writes, 'If you look at the failure rate for different departments . . . you will find that they differ from one another considerably, but year by year these remain extremely constant. Engineers . . . fail three times as often as medical students. An unvarying annual failure rate for each department suggests more than the fortuitous fluctuations of student ability. It suggests that each department has a more or less traditionally established failure rate.' Sanders[4] writes, 'Concerning the unreliability of the usual type of examination set . . . within universities there is evidence of considerable variability in results and pass rates between universities and between departments in the same university.' Malleson was not inferring that engineers in every university fail three times as often as medical students, nor does the variability of Sanders refer to fluctuation due to changes in student quality. These are only opinions, but the research evidence

exists in the work of Hartog and Rhodes[2] and others. The difficulty is to persuade academic staff that it is their duty to read it.'

In the first article I put forward the suggestion that one way to minimize these faults would be to incorporate objective tests into university examinations. They would form only a small part of the total mark, so that the virtues of the old-established examinations would not be lost, but the new tests would make it much easier for examiners to maintain a reasonably steady standard. Support for this idea came to hand immediately after the publication of the February article, in the form of an off-print describing an experiment with objective tests in a university medical faculty.[5] The researchers compared the value of objective tests and essay-type examinations for prognosticating the results in the third M.B. professional examination. After calculating correlation coefficients they concluded that 'though the conditions of the test favoured the essay-type class examination, the performance of essay and objective papers appeared to be approximately equal.' This verdict does not, of course, take into consideration one of the chief values of objective tests, mentioned above, that they could be used to maintain a steadier standard. Naturally the merits of such tests might well vary with the nature of the subject. If more university departments were ready to conduct controlled experiments enlightenment would come more quickly.

Yours faithfully,

Swansea. R. R. DALE.

NOTES

[1] Mr. Phillips denies this. I recently received a letter from a university lecturer in which he writes that a big change in the percentage of Firsts in his Department was 'correlated with the retirement of a very awkward Professor' and, 'I do think we were almost certainly wrong in denying a First to one candidate in the first period'. One also hears of Professors who pride themselves on the number of Firsts obtained in their Department. Between these two there is room for a considerable divergence.

[2] cf. Hartog and Rhodes, E. C., *The Marks of Examiners*, London, 1936.

[3] Malleson, Nicolas, 'Avoiding failure by university students', *The Listener*, March 5th, 1959.

[4] Sanders, C., 'Report on Academic Wastage and failure among University Students', Faculty of Education, University of Western Australia 1958, No. 38.

[5] Lennox, B., Anderson, J. R., and Moorhouse, P., 'A Comparative Trial of Objective Papers and Essay Papers in Pathology and Bacteriology Class Examinations', *The Lancet*, August 31st, 1957.

REVIEWS

The Use of Imagination. Educational Thought and the Literary Mind. WILLIAM WALSH. *Chatto and Windus.* 25*s.*

In educational terms, this book is mostly about personality development and the learning process. It also contains a chapter on the importance and nature of verbal communication. In saying this, I am conscious that no device of statement could more ironically bring out the discrepancy between the dry abstractions of educational categorizing and the riches which Professor Walsh has discovered in the literary productions he so compellingly and creatively analyses. He keeps in view throughout just such conceptualizing categories as I have evoked in my first two sentences . . . theories of testing, ideas about motivation, views on personality as measured by the psychologist, notions of adjutment and social engineering, all the abstract and dehumanized paraphernalia of the positivist aspect of educational theorizing. In their place he reasserts the need to consider the concrete particulars of experience in both the apprehending mind and in the world as apprehended. The fundamental nature of his undertaking can be gleaned from a sentence in his essay on 'G. M. Hopkins and a Sense of the Particular'; after quoting appositely from Hopkins, he continues:

> Those who want a literary component in the scientist's education do so not from any vague idea of general education or the rounded man but because they see it as an essential preservative of the sense of complex actuality in an education apt to dissolve existence into 'a world of formulas'.

What throughout he is concerned to insist on are the complex actualities which only the literary artists can render as against the 'scientific' educators who so easily dissolve the living beings of the educator and pupil into 'a world of formulas'. He reasserts the need for the 'unified sensibility' as against the analytic inadequacies of the positivist tradition.

To this end, he examines the world of childhood and the growth of mind, not in terms of abstractions, such as 'norms of development' or of 'emotional problems attendant on growth', but as involving a complex unification of sensibility in terms of the feeling intellect, the

combination of thought, imagination and passion. With Wordsworth he realizes that not only is intellectual advance connected with the presence of feeling (a proposition to which, to some extent, modern educationists would agree) but that also 'intensity of feeling becomes fineness of sensibility through being submitted to the play of intelligence', a proposition much less likely to meet with agreement or appreciation. What Professor Walsh is constantly concerned to insist on, through the agency of his witnesses, is that the act of knowing—in any rich or adequate sense of the term—involves a complex interplay of intelligence and affectivity. In this way he heals a breach which, among others, the Freudians have tended to perpetuate, a breach between intellect and emotion. My saying this may seem paradoxical in view of the Freudians' insistence on the close connection between the two; but, in effect, the abstract division of the psyche into passional 'id' and rational 'ego' (forgetting about 'super-ego for the moment'), of 'life' into the conflict of instinctual libido and 'harsh reality', of pleasure principle and reality principle, tends to reinforce a conceptualizing of reason and emotion as two separate if connected elements rather than, as Professor Walsh shows the great Romantics to have done, to have insisted on a harmony of interpenetration as the essential sign of psychic maturity and health.

And yet, having said this—in the very act of saying it—I become aware of an element of weakness in Professor Walsh's thesis. It is, moreover, a weakness to which I am myself all too readily prone, one to which in my first enthusiasm for his book I had almost succumbed, so that it had better out. My unease stems from the quite simple fact that Freudian analysts do in fact effect cures. In other words, this conceptualizing, this thinking in terms of abstract divisions, even this parcelling out the mind 'by rule and line', *has its uses*. In certain contexts it serves; however blunt an instrument it provides, such an instrument is, for instance, the best we have in the treatment of certain neurotic states, and without such treatment, the sort of health Professor Walsh has in mind is unobtainable for some people.

What, having realized this, I come to ask is that Professor Walsh should examine the assumptions behind the positivist outlook in education a little more thoroughly. For certain instrumentalities (and such instrumentalities do offer themselves) such a mode of categorizing may have its uses. Certainly it warrants a more careful assessment than it here receives. What he will rightly insist on is that even in the midst of 'use', the user shall be aware of complexities beyond the

immediate reference, and in so doing will be ready to transcend the 'use' if the 'reference' proves intractable. I would like Professor Walsh to transcend his own magnificent effort and examine more closely and in more defined and (yes) concrete terms the precise relationship between the tradition of growth and development he has so movingly enunciated in this book and that different, positivist tradition which, in its own way, though perhaps more haltingly, in a sense more arrogantly and therefore less surely, has also increased our understanding. And it is precisely because I have so much sympathy with and understanding of his undertaking (for we were nursed upon the self-same hill) that I want him to go on beyond it. After all, he himself admits that Lawrence's attitude to science was 'absurd'. Why? There will be a lot of people who will want to know more fully than Professor Walsh tells them and because he has not told them, they will be all too ready to dismiss what he has to offer.

Yet 'magnificent' is the right note on which to end this review. For this is one of the few books on education of our time which, widely read and comprehended, could bring us from our parochial and ultimately trivial quarrels about method and organization to a sense of the humanity for which we ought in fact to be educating. The essay on 'The Notion of Character in Education and Literature' brings us back superbly to the central dilemma of mankind which all the facile optimism of the Enlightenment has tended to hide: 'the fact that man ultimately is not at home in the world, that he is a person, but a displaced person'; and again, that 'every age is an "age of anxiety" '. He reasserts the autonomy and spontaneity of the individual as against the notion of mind 'as a function of social life'. Here, then, with finely managed appositeness and tellingly illustrated particularity, Professor Walsh juxtaposes the worlds of Byzantium and Columbia. Despite the comparative shortness of the essay, the issues generated strike at the very heart of our modern uncertainties; and here, the tempered stricture which I applied above is not relevant. Professor Walsh has seen steadily the implications of the two ways of life and has made his judgments with vivid economy.

For the rest, it is enough to say that the book is more than worth reading simply as literary criticism. The analysis of *What Maisie Knew*, for example, is excellent; and the quartet of comments on the four books for or about children admirably illustrate the sorts of ways in which great writers' insights into childhood could be used in sensitizing students to 'child behaviour' of a more complex and

rewarding nature than that which normally springs out of students' starved sensibilities. Finally, it is good to read Professor Walsh's tribute to Dr. Leavis as 'awakening conscience' and 'enlightening consciousness'—a most felicitous and just apposition. 'This book should be compulsory reading for everyone concerned with education'—the old time-worn cliché sentence of the Sunday reviewers for once deserves resuscitation.

G. H. BANTOCK

School and Community in the Tropics. T. R. BATTEN. *Oxford University Press*, 12*s*. 6*d*.

This book will be very helpful in clearing up muddled thinking about the degree to which the burden of adult education, and of community improvement generally, can be put on the shoulders of the schoolteacher in under-developed countries. After patient examination of the aims and hopes of the enthusiasts for the 'community school' and much quotation from the records of their successes and failures Mr. Batten makes three major points. First, 'that the teacher cannot effectively educate the children for community life if his purposes and those of the community conflict; and that the successful education of the children therefore depends on someone succeeding in educating their parents, together with the rest of the community'. Second, 'that the teacher cannot effectively educate *either* children *or* adults if he is held primarily responsible for educating both'. And third, 'that although he should be relieved of the major responsibility for educating adults, he can nevertheless give other community education workers very useful help'. This is the voice of commonsense after a great deal of misty stuff.

The negative case for 'community education' (or whatever it is called) has been worth making; but it has been easy to make. There is something wrong when a local community does not feel, in a real sense, that the school is its own school. There is something wrong when the teaching given makes no living contact with the minds and interests of the children and leaves them ignorant of the world and life immediately around them. There is something wrong when what is taught consists of routine verbalizings and inert ideas and has no connection with ways of living. The average school in many countries is open to criticism on these grounds.

But if, in reaction, the school ceases to give systematic mental

training there is no other organ or institution in society that will do this instead. The first purpose of an educational institution is to educate; and the only proper ground for including 'practical work' and 'community improvement projects' in the school curriculum is an educational one. When an enthusiast for such things writes: 'It is our hope that, beginning next school year, when half of the day will be devoted to practical, especially gainful, work activities.' . . . etc., it is time someone interrupted to say that this is perversion of the purposes of the school. Indeed, though this must have been as far away as could be from the enthusiasts' intentions, it begins to look too much like the system of education recommended to Nicholas Nickleby by Mr. Squeers.

It appears from Mr. Batten's book that the extravagances of the Community School experiment in the Philippines are now being corrected, and if a sensible balance can be struck the original protest may well have done good. But the logic of Mr. Batten's argument ought to have carried him on to some fundamental criticism of Mr. Gandhi's Basic Education in India. He quotes the observations of some of its supporters to the effect that all teachers *must* be re-oriented in this direction, and these quotations sound shockingly like brainwashing. The possibility is simply not allowed for that in quite important respects the theory (however understandable in the light of its origins) is simply wrong. Indian teachers who feel this—as many of them do—should be as free to persuade the devotees as the devotees should be to persuade them. Mr. Gandhi's original desire that schools should be largely self-supporting through the sales of the things made by the children would have turned schools into factories. His emphasis on traditional village crafts was technically backward-looking and educationally excessive. As Professor Kabir has said, it is difficult to teach algebra through spinning or weaving.

Given more limited aims, the movement to make teachers more aware of the communities in which they live and to ally themselves with others who are working for community betterment is a healthy one. Mr. Batten shows that it can succeed only if more attention is given to such attitudes in the training of teachers, and he indicates the broad ways in which this may be done. But on the positive side collective thinking needs to go further. Who is to decide what should be taught in a given primary school or secondary school in a given community in an under-developed society? Could not the social

workers, the agricultural extension officers, the health workers, sit down with the schoolteachers who have to do the job and discuss what it would be reasonable, and what it would not be reasonable, to do? In the countries that are trying to develop an educational system expressive of their own identity and at the same time appropriate to a fast-changing economic and social situation there is need for a truce to both academic conservatism and mere 'progressive' enthusiasm. We should move forward to collective professional consideration of what is needed and possible in practice. But, as Mr. Batten would insist, no mere professional planning will take real effect unless the parents see what is proposed, not as something imposed, but as what, after discussion, they would want for their children. And paradoxically enough, in wanting academic institutions to be academic they have often been more right, if even for the wrong reasons, than the more extreme of the reformers.

LIONEL ELVIN

The Sociological Imagination. C. WRIGHT MILLS. *Oxford University Press*, 40*s*.

In his latest book Professor Wright Mills lays about him with his accustomed aggressiveness on the subject of the social sciences in the United States. His central question is why, with more and more people looking to the 'sociological imagination' for guidance on the great issues before mankind, professional social scientists, in the very country in which they are in greatest profusion, should fail to match achievement to promise.

In answering this question, he examines in turn the two dominant 'tendencies' or 'schools' in contemporary American sociology. The first, which he describes as 'Grand Theory', identified particularly with Talcott Parsons of Harvard, applies itself to the construction of conceptual schemes intended to culminate in a systematic theory—or set of theories—of man and society. In order to see how far 'Grand Theory' helps, he examines in detail one of Parsons' best-known books, *The Social System*, which attempts to provide a theory about why societies hold together. Mills's devastating analysis, including paragraph-by-paragraph translations of some of Parsons' key passages into intelligible and concise English, may be cruel and sometimes less than fair, but it is certainly telling, and,

for anyone who has tried to pick his way through the ponderous baroque of Parsons' prose, provides the most entertaining pages of the book.

Mills's conclusion is that Parsons in particular and Grand Theory in general can offer *some* enlightenment on the important social issues—but not much. Their contribution is only on a very general level, and is made at the cost of oversimplifying and ignoring a host of qualifying influences on the way. 'Concepts,' he says, are 'fetishized' by Parsons and his followers, and in consequence Grand Theory is too generalized, too abstract, too remote from historical reality to be of much real use. This may seem a harsh verdict on a major sociologist and an important school, but it is convincingly argued.

The second 'tendency' to which Mills turns his attention commands much more influence in American academic circles, but is a more elusive prey. This school, represented by people like Paul Lazarsfeld and Samuel Stouffer, he (rather pretentiously) calls 'Abstracted Empiricism'. It inflates method into 'Methodology', he says, just as Grand Theory inflates conceptions into 'Concepts'. The main features of Abstracted Empiricism, as he portrays it, are an obsessional preoccupation with the minutiae of research method and their application to detailed surveys of circumscribed and peripheral topics. Its apologists argue that the results of these enquiries will in time 'add up', rather like a jig-saw, to a general sociological understanding of life in modern society, but, as Mills says, without attention to the major themes of modern times, this seems rather a vain hope. Like Grand Theory, he concludes, but for different reasons, Abstracted Empiricism stands condemned.

This, then, is Mills's picture. On the one hand, arid theorizing remote from empirical enquiry; on the other, the painstaking collection of precise but trivial data. Since these two schools dominate American sociology, he argues, the really important areas that lie between them are neglected. He almost despairs at the way academic politics and bureaucracy work to strengthen the twin heresies, and he pleads for more work—like his own, as he sees it—in the central tradition of sociological analysis, represented by giants like Marx, Weber and Durkheim, who did deal in facts, but also used them to interpret major historical changes relevant to the central problems of society.

It is a powerful case. Mills is offensively rude about some of his

fellow social scientists, and he occasionally leaves the ground in wordy flights, but on the whole the book is clear and well-argued; indeed, one of its attractions is that, like all his books and those of a few other sociologists, this has a theme, sustains an argument, carries a message. But, after all, is it true? Is American social science really in such a sorry state? Has the corruption gone so far? Mills is not noted for his tolerance or humility, and his picture is almost certainly overdrawn—in particular, American academic politics are surely not quite as conspiratorial as he would have us believe. Yet, to judge only from the publications of American social science, the 'tendencies' are there alright, and their dangers are obvious.

What, though, of Britain—how much of all this applies here? For one thing, sociology here is a much more puny profession—still shunned at Oxbridge, only one full Professor of Sociology in the country, and on the whole professional sociologists, who in Britain are mostly university teachers, far too occupied with their students to devote much time to either research or theory. As for the two American 'schools' Mills attacks, few British social scientists have ever found Parsons' abstract conceptualizing very attractive, and few have the resources for large-scale detailed enquiries like those of Stouffer or Lazarsfeld—though those who have often seem to slip into the same kind of irrelevant trivialization.

But the central problems posed by this book remain. Allow for the exaggeration, acknowledge that Britain is not America—and there is still the crucial issue Mills poses: what can the social sciences do to help man become more aware of mankind? In particular, how are sociologists to avoid the twin dangers—theory remote from reality and research bound up in the trivia of detailed investigation?

Mills's own answer, like that of David Reisman and William H. Whyte among others, is to write books on major social themes which are stimulating and important, but which, frankly, are *not* firmly grounded in solid empirical data. The truth is that books like Whyte's *The Organization Man*, Reisman's *The Lonely Crowd*, Wright Mills's own *The Power Elite* and *White Collar* are fun to read, but they build a mountain of plausible speculation out of a molehill of evidence. They may well be terribly wrong. In fact, in his own work Mills has shown that he has himself not yet satisfactorily solved the problem of how to discipline the 'sociological imagination'. To the two dangers he describes we could add a third

—the danger of writing about what are undoubtedly important social issues, but with strong prejudices and weak information. In a word, the danger of tendentiousness.

A better way, it seems to me, is to carry out detailed factual enquiries as accurately and objectively as possible, and then to relate the findings to what is already known from other enquiries and to broader social structures. Nor should the social scientist be afraid, in his final chapters, openly to go beyond the evidence, and discuss its relevance to human values and social policies. In this way, every enquiry could establish new truths and suggest critical new questions as well as dealing in important social issues. Theory would be built out of facts, new facts related back to theory—and the theory would be about the real problems of man in society in our time.

PETER WILLMOTT

The Emergence of German as a Literary Language. ERIC A. BLACKALL. *Cambridge University Press*, 52*s.* 6*d.*

This is an important and timely book; it is important because it is the first systematic account of the development of the German language in the eighteenth century through a study of both the views of the leading literary figures on language and their actual use of language; it is timely because recent literary criticism, on the whole, has come more and more to appreciate that literature is made of words and that a literary critic ignores stylistic analysis only at his peril. For stylistic analysis, at its best, has given rise to remarkable interpretations of literature and endowed criticism with greater precision, but not all ventures have been equally successful. At times, particularly in Germany, it has become yet another pedantry. This book should serve as a wholesome corrective to some of its defects; for it demonstrates the importance of a historical study of language as a basis of literary criticism. It makes this clear because Professor Blackall shows how creative writing, in the eighteenth century at least, grew up amidst a debate about the character of the German language, about the way in which language was to be used; he also shows how the discussion about language and the literary achievement in that language interacted. By this method, more depth is given to the study of the history of language than is usually found

in manuals on that subject; at the same time, literature is studied from a special point of view throwing light on how writers make use of stylistic traditions and how they seek, by way of experiment, to break new ground. To some extent, Professor Blackall attempts to write German literary history anew; it is, however, not his aim to write a comprehensive chronicle of literary events, which is all that conventional literary histories only too frequently achieve, but rather his work is a real history which allows us to see the connecting threads between works of literature. His approach is much more subtle than the old-fashioned search for influences, which, in its cruder form, used to bedevil much of literary history. If he detects 'influences' it is because he perceives that a certain style belongs to a certain strand of writing, and not because he assumes a casual relationship on account of similarities.

Such is the general tenor of Professor Blackall's method. It is applied lucidly and systematically; for although his argument necessarily contains much that is technical his style is always clear and concise, even if there are occasional echoes of the lecture-room. Although the author has packed a great amount of information into the book we never lose sight of the overall development. The story which this book unfolds is an exciting one. The German language, at the turn of the seventeenth and eighteenth century, was depressed, but less than a century later it had become one of the great literary languages of the world. Professor Blackall disentangles the process by which this transformation was wrought. To write in German in 1700 needed an apology; philosophers, like Leibniz and Thomasius, who were dissatisfied with this state of affairs, had first to vindicate the German language, but it was Wolff who first created a philosophical vocabulary and style. This was the beginning of the reform of the language. Through the literary journals, however, theorists, like Gottsched and Bodmer, reached a wider public. Gottsched, despite, or perhaps rather with the aid of, his pedantry, succeeded in standardizing the German language and from his Leipzig vantage-point strongly influenced German narrative prose through his theory of prose style, even if he ran into some violent opposition in his endeavour. His advocacy and use of a clear, natural, but 'reasonable', language prepared the way for the individual, but mature prose of Lessing, Winckelmann and Gessner.

Professor Blackall does not restrict himself to an examination of prose writing, but also studies poetry which 'represents language at

its highest peak'. He shows how German poets turned away from the Baroque style, from a formalistic mould of diction, to develop a more individual style and a more direct form of expression. He shows how Bodmer and Breitinger, the Swiss critics, influenced partly by English writing, partly by their discovery of medieval German poetry, pointed the way to a right use of metaphor; it was Klopstock, however, who by his dynamic language and by the rhythmic power of his poetry developed the grand manner. Another facet of linguistic usage is the culture of wit and feeling, of which the Anacreontic poets and Wieland's novels are the outstanding examples. All this reveals the varied uses of which German had become capable. Professor Blackall avoids over-simplification; he gauges the influence of the language of pietism, of the rococo and of the *Aufklarung* on the various writers, and then discusses how rationalist theories of language were further criticized by even subtler minds, by Hamann and Herder, who assigned to language a much more crucial function than the earlier writers had envisaged; for them, it was the very source of thought. Goethe inherited the ideas of Hamann and Herder, but also earlier traditions. His is 'the golden touch', even in his Leipzig rococo period, but much more so in his great *Sturm und Drang* poetry, in *Werther* and in *Urfaust*. The work of his youth shows how several strands of language are combined to great purpose. The book ends with this analysis of the language of the early Goethe; on the whole, this is a felicitous close since we can see not only the road to the finest achievement of literary German, but also the beginning of that achievement. It, however, also means that there is virtually no examination of Goethe's views on language; nor was the author able to stress the debt which Goethe owed to mature rationalist prose in his later fiction which, as Professor E. L. Stahl has argued, is anticipated by the prose style of the editor of Werther's letters. In a book which covers so much ground, it is, however, impossible to analyse all stylistic facets, though one might have wished that the importance and influence of the language of Lessing's drama had been more fully shown. It is the measure of an important book whether it raises important questions and whether it can serve as a model for further research. Professor Blackall's work meets this test; for questions about the relations between language and meaning, between form and content are brought to our attention from a novel point of view. We are invited to reflect on these problems when, for instance, we

read that Goethe's *Sturm und Drang* lyric poetry was not a discovery of content, but a discovery of form, and when we view this discovery in its historical setting. Furthermore, his method should yield fruitful results if applied to other literary periods. It should also have sharpened our eyes so that details in the overall picture drawn by Professor Blackall can be filled out.

This study will thus be an invaluable companion for all students of eighteenth century German language and literature. It appeared in the first year of Professor Blackall's term of office as professor at Cornell, but it was written while he was a lecturer at Cambridge; he offers it as a symbol of fruitful co-operation between scholars of the two countries. Through both its lucidity and learning, it should certainly further enhance the prestige of English scholars of German studies in the United States, for it allows us to understand more precisely one of the most important and most remarkable developments in European literature.

H. S. REISS

Sir Gawain and the Green Knight. A new translation by BRIAN STONE. *Penguin Books*, 2*s.* 6*d.*

Most of the poems of the Penguin Classics, under the editorship of Dr. E. V. Rieu, have been translated (let us use the word without commas for the moment) into a prose 'in which the style is that of a modern man speaking to men without artifice'. Mr. Stone, remembering Wordsworth, puts it that way. But who is 'without artifice'? The modern translator in his speech? or the men who read the translation? Whoever it is who is 'without artifice', Mr. Stone is too kind to Penguin Classics prose. Many are inclined to think that the House Style imposed upon translators results not in the sound of a man speaking but of a machine clattering, clattering out a flat neutral prose which neither the original author nor the translator are allowed to inflect with any individuality. Witness Mr. David Wright's *Beowulf*. Compare it with—say—Mr. Ronald Latham's Lucretius. The two poems are so dissimilar and the two translations are so similar. Judging from the translations alone, a reader might feel that the two poems seem to have emerged from the same machine at the same moment of history. Which moment? Hardly our own or any identifiable moment: yet only too truly our own.

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Still, these translations conveyed the story or the main ideas, and they sell by the tens or scores of thousands. It is a good thing that so many are acquainted with the *story* of *Beowulf* and the *philosophy* of Lucretius, thanks to the Penguin Classics. The story of the one and the philosophy of the other are impressive in themselves. But it is a pity that these readers do not also derive more than a hint of the tone of the original which qualifies the story or the ideas.

Mr. Stone (who, I am sure, is Mr. Brian Stone as it says on the title page. It says P. Stone on the cover: but covers are not passed for proof) seems to have argued against the House Style prose for *Gawain* and to have won. 'Plain English,' he says, 'would kill both the poem's harsh force and its sumptuous artistry.' He was quite right if by 'plain English' he meant that Penguin Classics prose; such a prose would have rendered the Gawain poet indistinguishable from someone as remote from him as Josephus. Mr. Stone deserved to win his argument.

Mr. Stone has given us a stanza by stanza verse translation, preserving the alliterative line, and the wheel and the bob of the original. His ingenuity must have been taxed to the uttermost:

> Some of the lines, which happened to contain words that have kept their meaning, translated themselves. . . .But if they had to be changed at all, I was at once faced with the necessity of finding three words of the right meaning and decorum, all beginning with the same letter and occurring in positions where the stress could harmoniously fall.

In the result Mr. Stone's version has one great virtue: the shape of his stanza on the page resembles very closely the shape of the Gawain poet's stanza. With one unfortunate exception—there is nothing to show the pause between the half-lines—we are offered a visual equivalent to what we hear when a stanza is read aloud.

In constructing his substitute for the original, Mr. Stone has had to be not merely ingenious. He is discreet, honest, sympathetic, but is often forced to become a 'translator' (with the commas) indeed. Compare this:

> Wel gay watȝ þis gome gered in grene
> & þe here of his hed of his hors swete;
> Fayre fannand fax vmbefoldes his schulderes;
> A much berd as a busk ouer his breste henges,
> þat wyth his hiȝlich here, þat of his hed reches,
> Watȝ euesed al vmbetorne, abof his elbowes,

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with this:

> YES, garbed all in green was the gallant rider.
> His hair, like his horse in hue, hung light,
> Clustering in curls like a cloak round his shoulders,
> And a great bushy beard on his breast flowing down,
> With the lovely locks hanging loose from his head,
> Was shorn below the shoulder, sheared right round,

and one also perceives the need for Mr. Stone's admission: 'There is something altogether softer about my translation.' Yet he has the right, because only, answer to this great and obvious objection:

> I shall reply that the loss of force is the result of no intention of mine, but rather of a change in the nature of the English language during the last six hundred years. I could go further, and point out that it was not this poet's language, but Chaucer's, which eventually developed into ours.

And he could add that his 'translation', though softer than the original, is not weak. His language is, in fact, quite robust by modern standards; and he follows the contours, the undulations of the original.

It is satisfactory, almost a relief, that so many will become aware of *Sir Gawain and the Green Knight*, of which Mr. Stone says, 'neither Chaucer nor any such succeeding English poet wrote a narrative poem of such extraordinary richness'. He might have chanced his arm and said it was the greatest narrative poem in English. He frankly confesses his failure to offer more than a substistitute: a confession buttressed by extracts from the original given in an Appendix. It would be well if the thousands of readers would look at these first and last, and attempt to go beyond Mr. Stone's *Sir Gawain*. Yet his attempt has been a worthwhile attempt. Moreover, his introduction is stimulating and he plays fair in his apology for his 'translation'. He evidently much enjoys and dearly values the poem.

He says that his version 'like the original, is written to be declaimed.' Why, in heaven's name, then, didn't he persuade publishers and printers to mark the pause between each half-line? In not insisting on a raised stop (in the manner of Skeat in his edition of *Piers Plowman*) or the insertion of a space (as in his extracts from the original—see the quotation above) between each half-line, Mr.

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Stone has made the declamation, or even the silent reading, of his version an unnecessarily difficult task for the majority of the public he aims at—those who think all poetry should sound tum-te-tum iambic. Perhaps he insisted but was overborne. Either way, it was unfortunate.

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